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Toxin and Antitoxin in Tuberculosis.—A substance, having a specific reacting power for the skin of tuberculous patients, was found to be alcohol-soluble and thermostable. It produced a more marked cutaneous reaction in experimental animals inoculated with few bacilli. The antitoxin proved of no therapeutic significance and did not prevent the action of the reactive toxic substance.—*Experiments on Toxin and Antitoxin of Tuberculosis, Tatsumi Ishiwara, Tokyo Iji-shinshi, December, 1922, no. 2309, Abstr. from Japan Medical World, April, 1923, iii, 90.*

Pitfalls in Diagnosis and Treatment of Pulmonary Tuberculosis.—The exceptional case, paradoxical though it seems, is really commonest in private practice. Most serious is the case which develops and progresses without characteristic physical signs. *Childhood tuberculosis:* The view is accepted that a primary lung focus gives rise to secondary infection of lymph nodes, from which the lung is again infected when the disease progresses. When for any reason immunity fails, disease spreads outward, showing itself in the radiogram first as mottling around both roots, later involving more and more lung area, till it finally reaches the periphery. This condition, whether slight or serious, we speak of as hilum tuberculosis, or glandular and hilum tuberculosis. Only at a late stage does it reach the periphery. However, upon careful examination, slight percussion changes, with a semicircular area of paravertebral dulness, will be detected. There may be also parasternal dulness, blowing breath sounds over the upper spines, and various other signs, but no crepitations. The stethoscope commonly yields no information at all. The really vital part of the diagnosis has to be deduced from the symptoms and history, often greatly helped by the study of a radiogram. In the more serious cases the radiogram is reliable; really active tubercle around the hilum gives shadows hardly mistakable, and the X-rays are also valuable in following the course of the disease. *Deep lung tuberculosis in the adult:* While hilum tuberculosis is the rule in childhood, it is by no means rare in the adult. Tuberculous outbreaks of early adult life are not infrequently extensions from deep areas around the root of the lung. Again the stethoscope is likely to fail us. A careful temperature chart, X-rays, and narrowing of the apical resonance are among the diagnostic criteria. It must be recognized that a lung may be full of deep disease without giving definite physical signs at the surface. Likewise, one may encounter supposedly unilateral cases with extensive deep seated disease of the other lung, only slightly less advanced. Given advanced hilum tuberculosis and unilateral signs, it is practically impossible to tell what may be happening in the depths of the other lung. It is especially this deep seated type of disease that provides advanced cases and swells the tuberculosis mortality, chiefly because it remains undiagnosed and untreated in its earlier stages. *Deceptive signs:* Crepitations do not always indicate active disease. Even febrile attacks and hemoptyses, in cases of long standing with cavitation, may occur without real clinical activity. Persistence of tubercle bacilli in the sputum probably signifies an unhealed sinus leading to a caseous area. *Dangers to the early case:* The wise practitioner will confine his patient to his home or his room when he suspects tuberculosis, and, if fever is present, bed rest is indicated. If all cases were treated thus, like acute illness at the outset, much time could be saved and recovery rendered more likely. When the case has been definitely diagnosed, a rest regimen should be

ordered at once. *The rationale of rest:* The primary indication is fever, or excessive auto-inoculation. But a further task remains in the erection of "fortifications" around the disease areas. On the purely mechanical side there are two cogent arguments, (1) the difficulty for a wound or inflammatory area to heal under the peculiar conditions of tension and movement present in the lung, and (2) the dependence of the pulmonary circulation on the systemic, which is of course increased by muscular activity. Thus the belief that exercise is harmless if it does not cause fever is unjustified. All cases of active disease tend to form areas of bronchopneumonia or caseation. Dettweiler has compared a tuberculous lung to a mulberry tree, on which are found at the same time flowers, and green, red and black fruit. Areas of fibrosis and softening may be in juxtaposition. While such patients can be got up and rendered ambulant, this intermittent movement and flushing with blood may be harmful. A further reason for rest is the need of the body for general physical recuperation. *Practical considerations:* Pulmonary tuberculosis, or suspected pulmonary tuberculosis, should be treated as a serious matter unless and until shown otherwise. Especially must the patient be prevented, when possible, from "settling up his affairs," which means in many cases a strenuous effort to put several weeks' business into a few fevered days. If the matter is properly put before him in all its seriousness, it often becomes apparent that this "settling up" is not so indispensable, or can be attended to by others. The length of the initial rest period, for febrile cases, should be roughly at least double the febrile period, and never less than two months, unless perhaps in cases of slight exacerbation of old trouble. With disease of considerable amount and activity, four to six months' rest is none too long. A matter worth mentioning is that the patient's tolerance to "autotuberculin" may fall low during prolonged rest, so that slight causes lead to rises in temperature. These can generally be ignored when it is decided that rest has been carried far enough. When rest has been carried on till the disease is really quiescent, the period of graduated convalescence can be carried through with more confidence and safety.—*Some Pitfalls in the Diagnosis and Treatment of Pulmonary Tuberculosis, C. Riviere, Brit. M. J., September 22, 1923, no. 3273, 491.*

Early Diagnosis of Pulmonary Tuberculosis.—A systematic review of the modern methods of examination in the determination of a beginning pulmonary tuberculosis. No new views are brought forth.—*Le diagnostic prècoce de la tuberculose pulmonaire incipiente chez l'adulte, M. Feys, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 461.*

Significance of Specific Tests in Tuberculosis.—The Pirquet test is of no significance, diagnostically or prognostically. The intracutaneous tuberculin test, when positive, cannot be further used diagnostically; repeated negative tests exclude tuberculosis in a questionable case if no complications exist; marked and moderate reactions are of favorable prognostic significance; the partial antigens of Deycke and Much are valuable, in many cases, to differentiate activity and inactivity, and to determine prognosis. The outcome of all tuberculin and partial antigen tests, however, is to be evaluated with attention to the clinical features.—*Die Bedeutung der biologischen Reaktionen für den Status und die Prognose einer Tuberkulose, R. Katz, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 182.*

Complement Fixation in Tuberculosis.—The authors have for the last two and a half years been investigating the reliability of their complement fixation test for tuberculosis as a means of diagnosis and exclusion of pulmonary tuberculosis. They believe that "a positive result is an indication of an active tuberculous lesion in the body, and that a negative result is a reliable indication, with a few rare exceptions, of the absence of such lesions." This opinion is based on the results obtained in over 2500 cases, both pulmonary cases and controls. The present article includes a review of the literature to determine what advance in knowledge has been made on the subject, since 1906. In discussing the variability of results due to employment of different antigens, it is pointed out that the most reliable results have been obtained with suspensions of whole or ground-up tubercle bacilli. In their own investigation a dilute emulsion of living tubercle bacilli was used. With antigens of the tuberculin type, especially such as Besredka's antigen, complement fixation may occur in syphilitic serums because of the presence of a large amount of lipoidal substance. In suspensions of whole bacilli, lipoidal substances are not present in sufficient amount to fix complement in the presence of syphilis. Another great advantage of these suspensions is that they are not to any appreciable extent anticomplementary. Extracts and derivatives of tubercle bacilli have the same disadvantages as antigens of the tuberculin type. In discussing the causes of differences obtained by

different workers using the same antigen the importance of a complete control of the cases on the clinical side and the employment of complete and accurate classifications are stressed. For the purpose of controlling a test for pulmonary tuberculosis the only definite criterion for a case of phthisis should be the presence of tubercle bacilli in the sputum, for there is no combination of symptoms and physical signs which is pathognomonic of tuberculosis and which cannot be simulated by other diseases. Finally, it is important to determine the amount of fixation of complement necessary for the reaction to be regarded as positive. Any appreciable inhibition of hemolysis in the presence of one and a half *H. D.* of complement, as estimated by titration, in the presence of antigen should be regarded as a positive reaction. It is also well known that very acute and advanced cases, also moribund cases, may react negatively. In the list of references appended none are later than 1919.—*Complement Fixation in Pulmonary Tuberculosis, Critical Survey, A. L. Punch and A. H. Gosse, Brit. M. J., September 22, 1923, no. 3273, 495.*

Wildbolz Reaction.—The Wildbolz auto-urine test for determining active tuberculosis is praised. The reaction is more pronounced than the auto-serum reaction.—*Biological Test of Human Active Tuberculous Foci by the Use of Intracutaneous Reaction with Autogenous Urine after Hans Wildbolz, Wasaburo Sakamoto, Nihon Hitsunyokibyo Gakkwai Zasshi, September, 1922, xi, no. 3, Abst. from Japan Medical World, March, 1923, iii, 56.*

Wildbolz Reaction.—Normal urine produced practically no reactions in phthisis cases, while the auto-urine tested on normal persons proved positive in 40 per cent of the cases and in tuberculosis cases it was positive in 55 per cent. There is no relation between the reaction and nephritis, syphilis and the administration of potassium iodide; likewise, the specific gravity and albumen content were of no significance. It is suspected that other substances besides tuberculin can cause a reaction.—*On Wildbolz's Auto-Urine Reaction, Shichijiro Niwa, Hokuetsu Igakkwai Zasshi, December, 1922, xxxvii, no. 6, Abstr. from Japan Medical World, March, 1923, iii, 58.*

Wildbolz Reaction.—With a most strict observance of the Wildbolz technique, the auto-urine test was done on a number of persons sick with tuberculosis and on a number of suspects. Tests were also done upon healthy and tuberculous subjects with urine from other tuberculosis patients. Healthy people occasionally gave positive reactions and some sick ones gave negative results with the test. The test cannot be regarded as a definite specific test to determine activity, although it may be a helpful test at times. Its specificity cannot be relied upon.—*Die Wildbolzsche Eigenharnreaktion, Ahrens, Deutsche med. Wchnschr., August 31, 1923, xlix, 1153.*

Urochromogen Reaction in Surgical Tuberculosis.—Continued, markedly positive urochromogen reactions are of bad prognostic significance. The prognosis can be good with alternating positive and negative reactions, but the duration of the illness must be reckoned with. Short periods of sanatorium treatment in such patients are valueless. Continued negative reactions over long periods, even in the presence of a poor general condition, should encourage the continuance of conservative treatment. If the possibility of operative interference exists with a positive urochomogen reaction, even in cases of not severe nature this should not be set aside for more conservative methods. The disappearance of the reaction after the operation is of value as indicating the result attained.—*Weitere Beobachtungen über die Bedeutung der Urochromogenreaktion bei chirurgischer Tuberkulose, E. Dehoff, Beitr. z. Klin. d. Tuberk., September, 1922, lii, 118.*

Urochromogen Reaction in Surgical Tuberculosis.—Weiss's observations on pulmonary tuberculosis are extended to the field of surgical tuberculosis. Positive cases were found prognostically unfavorable, while negative cases are to be considered favorable. The change from a positive to a negative reaction was noted many times, with improvement of the general condition or after surgical removal of the tuberculous focus.—*Erfahrungen mit der Weissschen Urochromogenreaktion des Harns bei der chirurgischen Tuberkulose, M. Flesch—Thebesius and L. Babette, Arch. klin. Chir., 1922, cxxii, 370.*

Diazo Reaction in Tuberculosis.—Weiss believed that the substance causing the diazo reaction is related to another substance normally in the urine. The permanganate reaction revealed urochrome which could be determined when the diazo reaction was negative. This test disclosed the first phase of the change of urochromogen into *uromelanin.* Further studies proved the identity of the urochrome of normal urines and the urochromogen of pathological urines. The designation *urochrome,* or normal yellow

urinary pigment, is not justified. There is no pigment in the urine which so predominates over others that it can be designated as the sole cause of the color of the urine. Actually, secondary pigments that originate from one chromogen are being dealt with. Urochromogen is a normal urinary constituent that is present in too small amounts in normal urines to give the Ehrlich or permanganate reaction. Both reactions are the expression of an increased urochromogen excretion. With Weiss's sulphonaphthol test it is possible to determine the diazo value as well as the quantitative content of the urine in urochromogen. The urochromogen is a part of the tissue waste of the body and permits certain deductions regarding cell destruction or the "destructive metabolism" of the body. This destruction is markedly increased in some diseases and cannot be balanced by foods. The increased urochromogen excretion is not pathognomonic for any disease; the outspoken diazo test indicates only a more marked cell disintegration. The positive or negative diazo is replaced by a more quantitative measure which can be compared to normal. There exists a relation between the diazo reaction and the severity of the disease. It is conceivable that the greater the tissue disintegration the more severe the disease. In tuberculosis the diazo reaction is of the greatest significance. Cirrhotic forms reveal normal or slightly increased values, while the exudative forms reveal increasing urochromogen excretions. While formerly the diazo and permanganate tests indicated the more advanced stages of consumption, it is now possible to determine the milder grades and at earlier periods. The increased urochromogen excretion is the forerunner or indicator of pending and outspoken cachexia. This is valuable for prognosis and therapy, and in some cases for diagnosis. Diseases of the kidney may disturb these relations. It is possible that urochromogen is formed only in the healthy kidney. The urochromogen is probably a product of nuclear disintegration and is increased in all conditions in which tissues rich in nuclei are disintegrating.—*Die Ehrlichsche Diazoreaktion als Gradmesser des Gewebszerfalles, M. Weiss, Wien. med. Wchnschr., January, 1923, lxxiii, 200.*

Simple Method for Determining Character of Urinary Infection.—Since certain bacteria can reduce nitrates to nitrites by testing for the latter with Griess's reagent the nitrate-reducers (which are the most frequent causes of infection of the urinary tract) can be differentiated from tuberculosis and streptococcus infections.—*Über eine einfache Reaktion zum Nachweise infizierter Harnwege, O. Weltmann, Wien. klin. Wchnschr., April, 1922, xxxv, 618.*

Autogenous Blood Reaction in Tuberculosis.—If a patient is injected with two drops of his own protein-free blood intracutaneously, a tuberculin-like reaction develops. From a study of 300 cases it is concluded that a positive reaction indicates active tuberculosis, while a negative reaction indicates the absence of tuberculosis, its latency or an anergic condition. The reaction has no prognostic value.—*Contribution á l'étude des réactions locales diagnostiques de l'infection tuberculeuse. L'autohémo-réáction, Dissertation, Montpellier, 1921, Abstract from Centralbl. f. d. ges. Tuberk.-Forsch., February, 1923, xix, 165.*

Sedimentation Reaction of Blood in Tuberculosis.—The rate of settling out of red blood cells from serum varies in different diseases and has considerable prognostic value in tuberculosis. To 0.4 cc. of a 3.8 per cent solution of sodium citrate, 1.6 cc. of blood is added. The whole is mixed and allowed to stand for fifteen minutes when determination is made. Blood from the tuberculous varies and the test is not specific, although the rapidity of settling out of the red cells fluctuates with changes in the clinical course of the disease. The test may often be used as an additional criterion to determine whether a case is active or inactive.—*Die Senkungsgeschwindigkeit der roten Blutkörperschen im Zitratblut bei der Lungentuberkulose, Teglmeier, Deutsche med. Wchnschr., August 24, 1923, xlix, 1113.*

Sedimentation Speed of Erythrocytes.—There are definite differences between the effects of electrolytes and nonelectrolytes upon the sedimentation rate of eyrthrocytes. The nonelectrolytes examined had no appreciable effect. Electrolytes exert a definite inhibitory influence upon the sedimentation rate. The action of the various electrolytes is not to be correlated with the anion or kation, although certain parallels can be drawn. The inhibitory action parallels the action upon the swelling of colloidal proteins. It is deduced from this that one factor in the sedimentation speed of the erythrocytes is the swelling of the protoplasmic surface of the erythrocytes.—*Zur Zenkungsgeschwindigkeit der Erythrocyten, F. Raue, Arch. f. exper. Path. u. Pharmakol., 1922, xciii, 150.*

Dark Field Examination for Tubercle Bacilli.—A comparison was made on 50 Ziehl-Neelsen sputum preparations using the transillumination and dark-field illu-

mination. In the same number of fields there were 1495 tubercle bacilli on ordinary transillumination and 3301 by the dark field, an advantage of 2.2 to 1 for the latter method. Tubercle bacilli were also found by the latter when ordinary transillumination gave negative results.—*Die quantitative Überlegenheit der Leuchtbildmethode nach Hoffmann gegenüber der Hellfeldbetrachtung von Tuberkelbacillen, W. Zorn, Centralbl. f. Bakteriol., Abt. I., Orig., May, 1922, lxxxviii, 95.*

Thermal Death Point of Tubercle Bacillus in Milk.—So discrepant have been the results reported by the many workers who have attempted to answer this question that it would appear necessary that the work be revised and any possible previous sources of error eliminated. At a temperature of 60°C., the time factor, or the necessary exposure of the bacilli to that degree of heat in order to destroy them, varied from five minutes to eight hours. At a temperature of 70°C. the results recorded are also conflicting, varying from one to forty-five minutes' exposure. Experiments were done with 25 strains of tubercle bacilli obtained from various sources at home and abroad, none of which were over eight months old. Fifteen were of the bovine type, the remainder being human tubercle bacilli. The methods of procedure are given in some detail, and it is emphasized that, besides being totally immersed, the milk sample should be suspended in the water-bath so as not to touch the bottom, for, if allowed to do so, it was found that the temperature of the fluid inside the container exceeded that of the water bath by from 2.5° to 3°C. The tubercle bacilli were added after the milk had been brought up to the correct temperature. In order to determine whether or not all the bacilli were killed at a given exposure guinea pig inoculation was done. No animal was killed before the tenth week, and in case of doubt reinoculation with the doubtful lesions was made. *Conclusions:* 1. Twenty-five strains of tubercle bacilli showed no wide differences in their thermal death point. 2. The thermal death point of the bacillus is practically similar for human and bovine types. 3. The previous wide variations in results have been due to too little care in carrying out the experiments and to the fact that the lesions caused in test animals had not previously always been given sufficient time to develop and be accurately diagnosed. 4. At a temperature of 60°C. it required 20 minutes' exposure to this degree of heat to prevent milk so treated from infecting guinea pigs. 5. At a temperature of 70°C. it required 5 minutes' exposure to obtain the same results. 6. Of these two combinations of time and temperature factors, the former excels the latter when the food value of the milk is also to be considered. 7. The writer is of the opinion, that until bovine tuberculosis can be stamped out at its source, namely in cattle, proper pasteurization is the only safe method of rendering milk safe as a diet for human consumption.—*A Critical Investigation into the Thermal Death Point of the Tubercle Bacillus in Milk, with Special Reference to Its Application to Practical Pasteurization, F. W. C. Brown, Lancet, August 18, 1923, ccv, 317.*

Tubercle Bacilli in Tuberculous Pus.—A modification of the method described by Bezançon and Philibert for finding tubercle bacilli in pus is described. One hundred cubic centimetres of distilled water and 10 to 20 drops of sodium hydroxide solution (strength not given) are added to 10 cc. of pus. The mixture is slowly warmed for 5 to 10 minutes, in place of boiling. After cooling the specific gravity is determined and if it exceeds 1004 alcohol is added to this point. The mixture is then centrifugated one-half hour. If the sediment proves negative it is treated again with sodium hydroxide solution. Of 48 cases 95 per cent gave positive results.—*De la recherche du bacille du Koch dans le pus tuberculeux, M. Larrouyet, Dissertation, Montpellier, 1921, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., February, 1923, xix, 149.*

Tubercle Bacilli in Blood of Tuberculous Guinea Pigs.—In the guinea pig tubercle bacilli of human or bovine types did not always appear in the circulating blood although a few cases revealed them. Bacilli found in the blood were not always living (evidently the presence of bacilli was determined by staining). It is concluded that bacilli may occur temporarily in the blood of the affected animals but their appearance is not regular.—*An Investigation on the Tubercle Bacilli in Blood of the Tuberculous Animals, Author's name omitted, Sei-I-Kwai Igakuzasshi, December, 1922, xli, no. 6, Abstr. from Japan Medical World, April, 1923, iii, 87.*

Changes of Acid-Fast Bacilli on Saponin-Containing Media.—The changing of tubercle bacilli into gram-negative, motile, spore-containing forms on media containing saponin described by Dostal, is attributed to contamination of the cultures.—*Uber Veränderungen säurefester Bakterien in Kulturen auf saponinhaltigen Nährboden, Schnürer, Centralbl. f. Bakteriol., Abt. I, Orig., October, 1922, lxxxix, 150.*

Fluid Egg Media for Cultivation of Tubercle Bacilli.—The egg media of Besredka (5 per cent egg yolk in distilled water containing 1 per cent soda) was tested. Favorable deep growth was obtained. Addition of egg yolk to 2 per cent glycerol-bouillon favored growth. To obtain a fine flocculation of the egg yolk it was mixed with 100 cc. of water, heated for 30 minutes at 70° to 75°C., passed through glass wool, and added in proportion of 5 cc. to 50 cc. of glycerol-bouillon. This can then be sterilized by heating in the Arnold sterilizer for one hour.—*Über das Wachstum von Tuberkelbacillen in eidotterhaltigen flüssigen Nährböden, E. Boecher, Ztschr. f. Hyg., 1922, xcv, 344.*

Goldfish and Acid-Fast Bacilli.—The fish tubercle bacillus grows rapidly on ordinary media at room temperature, especially on glycerol-carrot and fish-agar. In young cultures they resemble human bacilli, while old cultures show threads, and comma and transition forms. The kidneys are the site of predilection in infected goldfishes. Phagocytosis of the fish bacilli in the organs of fishes was rare. In the tuberculous nodes there were no giant cells, but in some places were small areas of caseation and marked round-cell infiltrations. Other acid-fast bacilli, inoculated intraperitoneally or subcutaneously into gold fishes, did not remain localized, but spread to the various organs, the spleen and kidneys being affected most. Acid-fast bacilli in the organs of goldfishes suffered marked extracellular bacteriolysis, while fish tubercle bacilli suffered this effect only slightly. Lepra bacilli developed especially in the brain of the goldfish. Acid-fast bacilli are only present in the intestines of healthy goldfishes and nowhere else.—*Experimentelle Versuche bei Goldfischen (Carassius auratus) mit säurefesten Bacillen, S. Maië, Centralbl. f. Bakteriol., Abt. I, Orig., May, 1922, lxxxviii, 28.*

Remarks on Clinical Tuberculosis.—The study of the spread of tuberculosis in families, the extension and course of the disease in the body, and the topography of pulmonary tuberculosis has been fruitful. Reliance is placed on the views of Ranke and Beitzke. The various disease pictures are differentiated; whether the infection is dependent upon a primary complex or whether the bacilli, not being retained by the bronchial lymph node filter, pass into the venous system and thence into the lungs. If only a primary complex exists, then, dependent upon whether the focus is in the apex, in the vicinity of the diaphragm or in the mediastinum, it can lead to various diagnostic errors (cardiac neurosis, gall stones, kidney stones, etc.). As long as only a primary complex exists tuberculin is used. If the bacilli have passed the primary complex this is called a proliferative primary complex. In this class is included miliary tuberculosis. The proliferative primary complex can originate from virulent or mild infection. In the former is included the *typhobacillose* of Landouzy, the more frequent occurrence of bronchial node symptoms without pulmonary findings, and polyserositis as a result of miliary seeding in the serous membranes. All of these forms present a hard, sharply defined splenic tumor. In the mild type, as a further form of hematogenous tuberculosis, the virulence of the agent is not sufficient to produce manifest tuberculosis. There occurs the variegated picture of Poncet, many eye affections, chronic residual pleuritis, and many rudimentary forms of polyarthritis. It is believed that the mild type also accounts for many persistent headaches, due to meningitis serosa or a chronic leptomeningitis. The differential diagnosis can be extraordinarily difficult. If, as a result of reinfection, bronchogenic foci occur, with an outspoken visceral tuberculosis, the clinical picture is regular and uniform in nature. For early diagnosis repeated lung examinations are resorted to, to determine whether a process is stationary or progressive.—*Die Klinik der Tuberkulose, W. Neumann, Wien. klin. Wchnschr., October, 1922, xxxv, 817.*

New Graphic System of Lung Signs.—Holmgren has described the advantages of graphic representation of chest signs as follows: 1. The time taken to record the signs is comparatively short. 2. A much better general impression is gained, and the mental picture can be quickly refreshed by a glance at the chart. The difficulty of course is to combine facility of expression with exactness of detail. In this the requirements of different physicians vary; the specialist needs a more complete and detailed system than the general practitioner. The author has constructed two graphic systems, one of 37 symbols for the sanatorium specialist, and one of 19 symbols for the general practitioner. Holmgren's system is unnecessarily detailed in regard to respiratory changes and difficult to condense into the small space of a chart. Bang's system is also overloaded with respiratory signs (he employs 54 symbols altogether), and their pathological basis is not always clear, while they fail to differentiate satisfactorily different grades of intensity of the process. Systems which employ different colors are impracticable. The abnormalities easiest to

indicate graphically are those concerned with percussion. The author uses a single vertical line to indicate dulness, with transverse lines to indicate its degree. Respiratory changes are likewise indicated in a simple manner. The important thing, however, is to indicate the numerous characteristics of râles with precision. Information is required with regard to the following qualities: size, number, resonance, moisture and loudness. The system here described indicates these properties by various dots and dashes connected to a main line in various ways. The signs are easy to draw and the space required is small.—*A New Graphic System of Lung Signs, J. Somme, Tubercle, August, 1923, iv, 488.*

Rôle of Fatigue in Tuberculosis.—That fatigue and its accompaniments constitute a larger factor in arousing latent tuberculous infection than appears to be generally recognized is the subject of this inquiry. The nature and causes of fatigue involve interesting and complex considerations, psychological, physical, chemical and nutritional. Collis and Greenwood hold that fatigue is not merely due to the using up of combustible material in the muscles, or to cerebrospinal or nervous fatigue, but is rather interference with the bodily mechanism due to accumulation of chemical products of activity. It appears to be widely accepted that fatigue is not so much an effect on the muscular system as on the nervous system. Occupations requiring close attention are a serious cause of fatigue, as are also prolonged labor and monotony. Bad ventilation, high temperature and humidity, and lack of atmospheric movement augment the effects. Irregular or curtailed sleep, imposed responsibility, chronic pain, grief or worry, infections, and faulty digestion, all contribute. There is ample evidence that fatigue is a predisposing cause of impaired health and of disease in general. Among its chronic effects are (Roth) anemia, digestive derangement, neurasthenia and cardiorespiratory disturbance. Malnutrition, so often cited as a causal factor in tuberculosis, is frequently a result of overfatigue. Emerson gives fatigue third place as a cause of malnutrition. Exhaustion, due to physical or mental stress, is a recognized factor in infections, such as furunculosis, while pneumonia during convalescence from exhausting injury or illness is not uncommon. Although mere physical exhaustion is recovered from in a few days, exhaustion from tuberculous toxemia may need weeks for restoration. On the other hand, the exhaustion from fear and worry may not be dispelled by bed rest, but may be controlled by occupational therapy, a means of securing mental rest. Unfortunately, there exist no valid quantitative tests for cumulative fatigue, and we are compelled to rely on clinical observation and judgment and the patient's subjective sensations.—*Fatigue as a Factor in the Cause and Treatment of Tuberculous Disease, H. A. Pattison, J. Am. M. Ass., October 13, 1923, lxxxi, 1252.*

Dyspepsia in Pulmonary Tuberculosis.—It would appear that hypochlorhydria or hyposecretion is the rule when dyspepsia is an accompaniment of tuberculosis. Hyperchlorhydria is present for many years in a number of phthisical patients prior to their becoming manifestly tuberculous, and consequently their indigestion bears little or no relation to their lung condition; these have probably formed the majority of the cases of hyperchlorhydria reported. It is suggested, then, that the usual effect of tuberculosis on the digestive function is one of inhibition, the quality and quantity of the gastric secretion depending on the degree of inhibition, and the quality and quantity of the secretion prior to the tuberculous onset. The charts obtained on these cases are of two types. The first shows reduced acidity, though thirty units are usually established, and rapid emptying of the stomach. The indigestion in these instances is never severe and rapidly yields to treatment directed to the stimulation of gastric secretion. Hunger pain, coming on two or more hours after meals and relieved by food, is the chief symptom. This type is uncommon and may be the result of slight inhibition or only an early stage of the second variety. In association with the second type, the following symptoms are noted: 1. Flatulence occurring from a quarter to half an hour after meals, becoming marked after the mid-day and afternoon meals. In the more severe cases, flatulence accompanied by intestinal flatus comes on toward midnight. 2. A feeling of "fulness" or "tightness." 3. Nausea may be constant or come on at the sight of food, during or immediately after a meal. 4. Vomiting is rare. The main feature is the intolerance of fats, alone, or in a mixed diet. Examination of the abdomen in the early stages often proves negative. In the later stages, the stomach is more often dilated. The cecum is almost invariably dilated and splashing is easily elicited. The colon is frequently palpable as a hard, tender band in the left iliac fossa. *Gastric analysis:* Resting gastric contents vary from 25 to 75 cc. Owing to the quantity of mucus it is difficult to be certain that the stomach has been emptied. The amount of bile varies considerably. Free acid may be absent,

present in small amounts at intervals, or constantly present, but reduced in amount, the total acidity then following the free acid curve. Thirty units, or 0.1 per cent, is seldom established. Starch is still present after a gruel meal at the end of three hours. Bile is rarely present before two and a quarter hours after the test meal has been given. Mucus, both free and mixed, is present in considerable quantities and increases toward the end of examination. The symptoms and clinical findings point to a general inhibition of alimentary function. *Treatment:* 1. Oral hygiene, with the use of an acid mouth-wash, night and morning, is important. 2. Acid-nitrohydrochloric dilute, 10 to 30 minims, should be given before or during each meal. Sodium bicarbonate, taken before meals, will excite excretion, but usually this is insufficient, except perhaps in the first type mentioned. With the acid may be combined infusions of gentian, calumba, quassia or glycerin-pepsin; salol or dimol may be used as an intestinal disinfectant. 3. Liquid paraffin, with agar-agar as an aperient, is advised. Instruction on the desirability of regular defecation should be given. 4. Excessive diet should be avoided. Milk should be given in moderation, and the addition of a little citrate of soda helps its assimilation. Any mixture of protein with fats in a liquid form should be avoided. Meats should be cooked in their own juices. Milk should not be given at meals at which meat is served. Carbohydrates should be served at meat meals.—*The Digestive Function in Pulmonary Tuberculosis, J. G. Hislop, Lancet, August 4, 1923, ccv, 221.*

Phrenic Shoulder Pain in Disease Involving Diaphragm.—Pain produced by irritation of the diaphragm is never localized within the diaphragm, but is always referred to some distant portion of the body. Anatomically, the phrenic nerve arises from the third, fourth and fifth cervical nerve roots, mostly from the fourth. It carries motor and sensory fibres, the latter supplying the pleural and peritoneal surfaces of the diaphragm, except at the rim, the pleural pericardium and to some extent the suprarenals, the coronary ligament of the liver and possibly the liver itself. Embryologically, the diaphragm, heart and liver arise in the head and neck region, and in their descent the phrenic lengthens to innervate the diaphragm. In a consideration of the physiology of the phrenic and other nerves supplying the diaphragm, the general laws of the production and distribution of visceral pain, as outlined by Head, have direct practical application. Capps found that the visceral pleura has no pain sense and that pain from the parietal pleura, which is supplied by the intercostal nerves, is localized accurately over the spot affected. The diaphragmatic pleura receives its sensory supply from the phrenic and lower six intercostal nerves. Irritation of the central portion, which is supplied by the phrenic, causes pain in the neck and shoulder on the corresponding side. Pain arising in the peripheral rim of the diaphragm for a distance of 2 or 3 inches in front and lateral, and for about one-third of the distance posterior, is referred along the intercostal segments to the lower thorax, lumbar region and abdomen. Phrenic shoulder or neck pain has been described in the following conditions: pneumonia, pleurisy, pericarditis, pulmonary infarct, actinomycosis of lower right lung, liver abscess, perforated gastric or duodenal ulcer, subphrenic abscess, cholecystitis with peritonitis, perforation of the gall bladder, perisplenitis, rupture of the spleen (spontaneous), acute pancreatitis, appendicitis, ruptured extrauterine pregnancy, pressure of drainage tube, and suprarenal tumor. Referred pain to the shoulder and neck is characterized by its spontaneous appearance and its accurate localization in the distribution of a spinal segment, or to a small portion of the segmental sensory distribution, by accompanying hyperesthesia and hyperalgesia and often by increase of pain during deep inspiration, cough or change of position. Pain referred to the abdomen from the diaphragm is in the abdominal wall and not in the viscera. Here, hyperesthesia and hyperalgesia are a differential feature. As a rule, deep pressure is well borne in referred pain, a fact that is not the case in disease involving the abdominal viscera. The mechanism of production of this pain from abdominal conditions is discussed and four case reports are included. *Conclusions:* 1. Referred pain to the shoulder region in diseases involving the diaphragm is a fairly common occurrence. 2. The importance of this clinical symptom is probably not sufficiently emphasized by the average clinician. 3. The diagnostic value of phrenic shoulder pain is definite. When typical, it is a positive indication of an irritation to the phrenic nerve and should be sought where disease is suspected in the upper abdomen or lower chest.—*Importance of Phrenic Shoulder Pain in Disease Involving the Diaphragm, T. G. Orr, J. Am. M. Ass., May 19, 1923, lxxx, 1434.*

Genesis of Tuberculous Hemoptysis.—A summary of the causes of tuberculous hemorrhages is given. Every attempt at schematic arrangement from a therapeutic standpoint is valueless.—*Contribution à*

l'étude de la genèse des hémoptysies tuberculeuses, P. Rudel, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 464.

Statistics on Miliary Tuberculosis.—As a result of a study of 200 cases, the Weigert dictum of the origin of miliary tuberculosis from the veins or thoracic duct was corroborated, as against the contentions of Baumgarten, Ribbert, etc. Besides corroborating well known facts, several interesting points were brought out by the study, such as a preponderance of the disease in the spring months, a greater incidence of tuberculosis of the thoracic duct as the origin of miliary tuberculosis with increasing age, the impossibility of a satisfactory explanation of the differences in the miliary tubercles in the different parts of the lungs, and the healing of the miliary tubercles in individual cases.—*Statistische Mitteilungen über Miliartuberkulose, A. Hartwich, Virchow's Arch. f. path. Anat., 1922, ccxxxvii, 196.*

Sepsis Tuberculosa in Case of Polycythemia.—In a case of *polycythemia vera* autopsy revealed a general tuberculosis in which the localization and histology of the tuberculous lesions were very striking. The spleen was the most markedly involved organ. The lesions presented simple necrosis, without reaction of the surrounding tissues and without exudation, but with numerous acid-fast bacilli. The picture resembled that described by Landouzy as a *typhobacillosis*. It is believed that in this case the polycythemia existed before the dissemination of the tuberculosis and that the spleen was the place of least resistance on which the *sepsis tuberculosa* became grafted.—*Über Sepsis tuberculosa gravissima bei einem Falle von Polycythämie, K. Rennen, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 197.*

Tuberculosis of Ear and Nose.—According to Habermann, Schwabach, Bezold, Herzog and others the middle ear is frequently affected by tuberculosis and at any age. Leegard examined clinical material in 200 cases with purulent otitis and 10 per cent were tuberculous. In children under 1 year of age middle ear tuberculosis is frequent (percentage figures are lacking on account of the few cases available), at 1 to 5 years 25 per cent, 5 to 10 years 17.5 per cent, and 10 to 15 years 8.6 per cent. In adults figures are lacking but Leegard estimates it at 5 per cent. In adults middle ear tuberculosis occurs in the second and third decennia men being affected more frequently than women. Infection is more frequent in children with a history of acute infectious disease. These diseases seem to predispose to tuberculosis. As regards origin two questions are important: (1) the source of the bacillus and (2) the ways in which it reaches the middle ear. Primary tuberculosis is rare (Brieger, Leegard). Secondary middle ear tuberculosis is far more frequent, usually arising from a focus in the air passages. The transport of the bacilli to the middle ear can occur in a number of ways: (1) by the Eustachian tubes, (2) hematogenously, (3) by direct extension, and (4) through persisting perforation of the drum. Methods (3) and (4) occur rarely but cases are reported (Agazzi, Neumann). The most frequent method is (1). In some cases extension is by continuity along the tube, but ordinarily the tube remains free from infection and is merely an avenue for infectious material (Brieger). Secondary hematogenous infection occurs when frequent infections exist and a general tuberculosis ensues (miliary). Usually the mucous membranes are attacked first and then extension involves the bones. By continuity the entire middle ear is affected. Four types are differentiated (Brieger): (1) lupus, (2) infiltrative, (3) fungoid and (4) necrotic. Type (1) is rare, while the other three forms are merely phases of the same tuberculosis. Bacteriological and histological examination and guinea pig inoculation are important. Tuberculin test is of no value. The complications are *pachymeningitis externa* and labyrinthitis. Facial paralysis is common. Vascular erosion and hemorrhage can occur. Intracranial complications, such as meningeal tuberculosis, tuberculous sinusphlebitis and brain abscess, are rare. Cholesteatoma is common in a healed tuberculous lesion (Ulrich). Healing has been observed clinically, but the percentage is difficult to determine. Tuberculous otitis media has a bad prognosis since it depends on the progressive nature of the pulmonary tuberculosis, while the prognosis of an acute tuberculous otitis in not too small children is more favorable, and probably good. In adults it is poor. The prognosis is dependent on the therapy. There is disagreement as to the proper therapy. The disease is best not treated as a local, but rather as a general disease, and thus all local treatments are gradually losing favor. An ear ready for surgical intervention must be operated upon. Sun-bath treatments have given good results (Cemach), when combined with climatic, dietetic and specific treatment. Quartz light is not as efficient as sunlight. Good results have been reported with X-ray treatment, but surgical extirpation must precede it. Gerber saw only 0.28 per cent tuberculosis of the nasal mucous membranes among all his

cases and Chiari only 35 among 24,410 neck and nose cases. A large series at the present time would undoubtedly yield high figures. Associated with lupus vulgaris the figures run from 38 to 72 per cent of associated mucous membrane tuberculosis. It may occur as a primary or secondary infection, but the extension of the process defies accurate differentiation. Infection can occur: (1) hematogenously, (2) aerogenously, (3) by contact, (4) lymphogenously, (5) *per continuitatem* and (6) nasal lupus as a result of bone tuberculosis. In the majority of cases infection starts in the mucous membranes, later affecting cartilage and bone. Two forms are differentiated by all authors: (1) proliferative and (2) necrotizing or ulcerative. The former is commonly primary. The site of predilection is the septum. In widespread cases the process can involve the nasal sinuses and the lachrymal ducts (dacryocystitis), although the former is rare. Early, the diagnosis may be difficult; eczema and syphilis must be differentiated. Positive tuberculin and Wassermann reactions are of only relative value. Bacilli are found rarely, but are of the greatest diagnostic value. The prognosis is best in the primary, but unfavorable in the secondary forms. It is bad in the necrotizing forms. The prognosis is the more favorable the less widespread the process, and therefore early diagnosis is important. Early operative eradication may stop the process. Many methods of therapy are recommended, such as roentgen, chemotherapy with heavy metals, krysolgan, pyrogallol, lactic acid and tuberculin. Stupka and Dedek prefer surgical removal if possible. Sun therapy gives good results in some cases.—*Der derzeitige Stand der Lehre von der Tuberkulose des Ohres und der Nase, W. Brock, Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 385.*

Tuberculosis of Thyroid.—There have been reported so far only two cases of tuberculosis of the thyroid, one by v. Schiller and the other by Pollag. The author's case was a 19-year-old male in whom diagnosis was established only by histological examination of a specimen removed during a surgical operation. The initial affection of the thyroid developed fistulae through which pus escaped into the subcutaneous tissues, where a cold abscess formed.—*On Tuberculosis of the Thyroid, Hajine Ito, Chugwai Iji-Shimpo, January, 1923, no. 1027, Abstr. from Japan Medical World, May, 1923, iii, 106.*

Tonsils and Tuberculosis.—Tuberculosis of the tonsil was studied in 173 bodies at autopsy: 161 were cases of tuberculosis; in the other 12 tuberculosis was present somewhere in the body in 10 cases. Of the cases of pulmonary tuberculosis, 73.2 per cent showed tuberculosis of the tonsil. Of the 10 in which tuberculosis was present, but was not the chief finding, one, a girl of 8 years, had tuberculosis of the tonsil and mesenteric lymph node tuberculosis. It was considered a case of ingestion infection.—*Tonsillen und Tuberkulose, P. Fischer, München. med. Wchnschr., July 6, 1923, 873.*

Review of Tuberculosis of Upper Air Passages.—An extensive bibliography and brief review of the recent views on infection and treatment of tuberculosis of the upper air passages are given. Very little new information has accumulated on the pathological anatomy of laryngeal tuberculosis since 1914. Numerous new and modified therapies have, however, been suggested, including chemicals, tuberculins, galvanocautery, roentgen and radium raying.—*Ergebnisse oder Übersuchtsberichte. 7. Über den derzeitigen Stand der Lehre der Tuberkulose der oberen Luftwege, W. Pfeiffer, Centralbl. f d. ges. Tuberk.-Forsch., July, 1922, xviii, 1.*

Rib Resection for Cold Abscess of Thorax.—Anatomic studies show that in cold abscesses of the thorax the subcutaneous lesions are the end-results of deeper-seated foci in the ribs or lungs. The rational treatment should be directed toward the primary lesion. As a basic principle of surgical treatment it should be laid down that a small lesion requires radical intervention. In cases with a pachypleuritis the entire focus must be laid open. The more extensive the rib resection the greater the opportunity for good results. Two cases are reported.—*Sur la technique de traitement des abcès froids du thorax par la résection costale large, F. Gaches, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 461.*

Exudative Pleurisy with Cholesterol Crystals.—A case of exudative pleurisy of empyema character is reported, which revealed microscopically many cholesterol crystals. Clinically it resembled an empyema.—*On Exudative Pleurisy Having Cholesterin Crystals, Yuzo Senju, Kenyokwai Zasshi, December, 1922, no. 161, Abstr. from Japan Medical World, March, 1923, iii, 59.*

Tuberculosis of Pericardium.—The existence of primary pericardial tuberculosis has been questioned. Recently Hedblom has collected 8 apparently primary cases. Roberts states that most cases are chronic, and secondary to tuberculosis else-

where, especially the lungs and bronchial lymph nodes. Of 83 cases of pericarditis, occurring at St. George's Hospital between 1911 and 1921, three, or 3.6 per cent, were of tuberculous origin and one of these was doubtful. Two of the three showed caseating tuberculosis of the thoracic lymph nodes; the other, bilateral apical tuberculosis and pleuritis. In the two definite cases the pericardial tuberculosis was miliary. An additional case is reported of a girl of 6 weeks, who was taken acutely ill with fever, languor and cough. There was no increase in cardiac dulness, and no friction or murmurs, but precordial percussion was painful. There was evidence of some bilateral pleurisy with effusion. Necropsy showed a severe chronic proliferative pericarditis, with granulations and "melon-seed" bodies. No tubercles were found in the lungs, which were engorged; but both pleurae and peritoneum were inflamed and contained fluid. A few tubercles were found in the liver, and a small caseating focus on the margin of the spleen. The lymph nodes showed no obvious abnormalities. The pericarditis, though not proved to be tuberculous, would seem to have been the primary seat of disease; otherwise, the origin of the miliary visceral tubercles is hard to explain.—*Tuberculosis of the Pericardium, W. E. Waller, Lancet, August 11, 1923, ccv, 278.*

Gastrointestinal Disturbances in Tuberculosis.—Even in childhood the intestinal tract is the second most important avenue of tuberculous infection. Infection can occur by way of the intestines without organic disease in them; they then are only a portal of entry. Dyspeptic disturbances of all kinds favor the possibility of infection. The condition and activity of the gastrointestinal tract, with its draining lymph nodes, gain in importance if the individual is already tuberculous. The intestinal tract can be affected. Since every intercurrent infection can act unfavorably upon the existing tuberculosis, for prophylactic purposes attention should be centered on the digestive organs. Difficulty or pain on swallowing, especially when associated with prolonged remittent fever, should lead to a suspicion of tuberculosis (lymph nodes at the bifurcation of the trachea). The diet gains in importance. Overfeeding is warned against. Not only the quantity, but the quality of food is important. Dyspepsia is frequently an early symptom of tuberculosis. Loss of appetite is difficult to combat. Therapeutically, washing of the stomach is frequently of value. The swallowing of sputum should be cautioned against. Tubercle bacilli frequently pass through the intact gastrointestinal tract (in 258 gastric operations tuberculous ulcer of the stomach was found only twice). Primary tuberculosis of the stomach has never been described, and secondarily is rare. A clinical picture of subjective symptoms of gastric ulcer may be seen without objective findings of this disease. In these cases, there exist vagotony and frequently slight fever. In these cases there is an active tuberculosis, probably of the bronchial lymph nodes with functional disturbances of the neighboring vagus nerve. Intestinal tuberculosis, however, is frequent (in 40 per cent of fatal tuberculosis cases). It is found as multiple lesions of the mucous membranes and as solitary hyperplastic lesions. Diagnostically, rectoscopy is frequently valuable, besides the determination of occult blood by the method of Kirch and Loll. The lesions show a marked tendency to healing with resulting stenosis. Small intestine stenoses are often resected with good results. If the tubercle bacilli pass the intestinal wall without being destroyed they cause infection of the regional lymph nodes, the picture of tabes mesenterica of the child being produced. In the adult, tuberculosis of the mesenteric nodes can be subacute or chronic.—*Magen-Darmstörungen bei Tuberkulösen, C. Reitter, Wien. med. Wchnschr., January, 1923, lxxiii, 101.*

Diagnosis of Intestinal Tuberculosis.—With certain precautions, occult blood in the stools is diagnostic of intestinal tuberculosis. The benzidin test is to be preferred.—*Zur Diagnose der Darmtuberkulose, Bemerkungen zu der Arbeit von Dr. Wilhelm Loll, A. Kirch, Wien. klin. Wchnschr., March, 1922, xxxv, 106.*

Healing of Tuberculous Ulcers of Intestines.—From histological studies it appears that in the regeneration of tuberculous lesions of the intestines, besides the usual epithelial growth at the borders, there is a growth of glandular tissue in the deeper tissues. After sloughing of the diseased portions there occurs an epithelial regeneration from the remaining deeply situated glandular tissues. The contention that there is an implantation of the epithelium, bordering the ulcer, on to the floor of the ulcer is not agreed with.—*Über die Regenerationsvorgänge bei tuberkulöser Ulceration des Darms, H. Schünemann, Virchow's Arch. f. pathol. Anat., 1922, ccxxxviii, 135.*

Diffuse Peritonitis Caused by Rupture of Tuberculous Mesenteric Lymph Node.—A case of suspected peritonitis in a 10-year old boy, with pain in the midline and

in the vicinity of the appendix, turned out to be a perforated tuberculous mesenteric lymph node, with normal appendix at operation, with subsequent recovery after surgical treatment. From a diagnostic standpoint, frequent attention is called to the differentiation of mesenteric node tuberculosis from acute appendicitis, but no case was found in the literature in which the node ruptured with consequent peritonitis.—*Diffuse Peritonitis, verursacht durch eine tuberkulöse Mesocolondrüsenperforation, M. Molnar, Centralbl. f. Chir., May, 1922, xlix, 701.*

Chronic Icterus due to Compression by Tuberculous Lymph Node.—Icterus occurred in a case of cholelithiasis, during the course of which the palpable gall bladder diminished in size. At operation the usual stone was not found, but the compression of the duct was due to an enlarged tuberculous lymph node in the hepatoduodenal ligament. —*Chronischer Ikterus durch Kompression einer tuberkulösen Lymphdrüse, A. Hübsch, Centralbl. f. Chir., April, 1922, xlix, 437.*

Chronic Icterus Due to Compression by Tuberculous Lymph Nodes.—A 15-year-old patient had icterus which persisted for weeks without change. At operation a group of tuberculous lymph nodes compressing the bile duct were found. Cystoduodenostomy was performed with success and recovery.—*Chronischer Ikterus durch Kompression tuberkulöser Lymphdrusen, O. Orth, Centralbl. f. Chir., December, 1922, xlix, 1799.*

Surgery of Bone Tuberculosis.—It is inadvisable to wait too long in suitable cases before operating for bone tuberculosis. By acting early the entire area can be removed surgically and the course of the disease shortened. A widespread tuberculosis of the pelvis and left hip joint was operated upon with satisfactory results. In advanced rib and sternal tuberculosis operation resulted disastrously. It is recommended that all cases be subsequently treated with roentgen rays.—*Zur Klinik der Knochentuberkulose, H. Reh, Wien. klin. Wchnschr., November, 1922, xxxv, 884.*

Tuberculous Articular Rheumatism. —Tuberculous articular rheumatism (Poncet) cannot be questioned. In 12 exhaustively reported cases the diagnosis could be definitely established. From a differential diagnostic standpoint syphilis must always be considered. Prognostically, ankylosis of one or more limbs is to be expected. Specific therapeutic measures for the localized disease do not exist; all attempts are only palliative. There remains nothing for the physician to do except to improve the general condition of the patient.—*Contribution à l'étude du rheumatisme articulaire tuberculeux, F. Gonzalez-Medina, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk-Forsch., April, 1923, xix, 482.*

Cerebrospinal Fluid in Pott's Disease. —In certain cases of Pott's disease pachymeningitis occurs as a complication. Since this is of great significance in prognosis, the author sought evidence of diagnostic value in the cerebrospinal fluid in 66 patients. In summary, it can be stated that hypertension, lymphocytosis and hypochloruria in Pott's disease are certain signs of unfavorable prognosis of an existing pachymeningitis. —*Contribution à l'étude du liquide cèphalorachidien au cours du mal de Pott, C. Brahic, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 474.*

Laminectomy in Pott's Disease.— Neurological complications in Pott's disease are fairly common (5 to 8 per cent of cases) and may involve either the cord or nerve roots or both. The complication is much more common when the bone disease has been rapid and extensive, and is more often caused by cold abscess formation which produces pressure; less often by bone compression, edema of roots or cord, obliterative endarteritis of the cord vessels or pachymeningitis. Hyperextension of the spine should always be first resorted to if complication occurs and ninety per cent are usually cured by such treatment. Absence of signs of neurological improvement after six to ten months indicates the desirability of laminectomy which will relieve symptoms in all but the pachymeningitis cases. The operation should by no means be done indiscriminately.— *Laminectomy in the Paraplegias of Pott's Disease, N. Sharpe, Am. J. Surg., 1923, xxxvii, 142.*

Possible Operative Method in Tuberculous Spondylitis.—A periosteum-covered, vascular, pedunculated rib is brought to either side of the diseased area, after having been obtained by subperiosteal resection, and is placed diagonally. These diagonal pieces will rapidly calcify and unite, thus resulting in immobilization. In addition, a subperiosteal rib-transplant is placed in the angle between the spinous process and the vertebrae. The operation is recommended to be performed in two stages but has not been tried in the living patient.—*Eine Stützpfeileroperation der Wirbelsäule. (Ged-*

anken zur operativem Behandlung der Spondylitis), V. Hoffmann, Centralbl. f. Chir., September, 1922, xlix, 1443.

Albee's Operation in Tuberculous Spondylitis.—The method as recommended by Albee is lauded. A bone transplant, put in 1¾ years before, was found completely healed and in good bony union in one case. In another case, in which two splices were placed to the right and left of the vertebral column, according to Henle, bony union did not occur in both, but connective tissue union only was found in places.—*Zur Frage der Spanbildung und Einpflanzung des Spans nach Albee bei Spondylitis tuberkulosa, H. Görres, Centralbl. f. Chir., May, 1922, xlix, 784.*

Technique of Henle-Albee Operation.—The objection to the Henle-Albee operation in small children, on the ground that the spinal processes cannot be easily split and therefore the span is best placed transversely, is not concurred with. This difficulty was never encountered, and even in small children there resulted solid healing and good results. After exposure of the spinous processes, they are held singly between the thumb and index finger and are split in the middle as deeply as possible. A strong bone splice, obtained with a sharp knife-like chisel, is pressed into the groove, and is safely fixed through the roots of the spinous processes on both sides by means of silver wires. The silver wires are inserted before the introduction of the splice and are efficiently tightened afterward. The after-treatment in children consists of fixation in the steep abdominal position; in adults, in rest on the back on top of pillow props.—*Zur Technik der Henle-Albee Operation, Elsner, Centralbl. f. Chir., February, 1922, xlix, 257.*

Celluloid Splints for Tuberculous Spondylitis.—The plaster bed, corset or band is satisfactory for alleviating pain. The discomfort from these encourages earlier discontinuance than the diseased condition warrants. Surgical procedures which bring rest to the vertebral column (Albee operation, etc.) are preferred. In view of Lexer's attitude that bone splints are difficult to prepare satisfactorily, celluloid strips have been tried with satisfactory results.—*Die operative Schienung der spondylitischen Wirbelsäule mit Celluloidstäben, P. Pitzen, Centralbl. f. Chir., August, 1922, xlix, 1134.*

Plastic Operation for Tuberculous Knee.—In cases of tuberculous joint inflammations, in which, after years of fruitless conservative treatment, a permanent painful, atrophic, bent and contracted knee has resulted, it is recommended that a procedure be used which has given good results in three cases. All the diseased tissue, including bone and cartilage, is removed, and the lesion closed by a fascia-joint plastic operation. In other cases, when it is not possible to obtain a movable joint, when contractures subluxate the lower leg, or the process is extensive, an arthrodesis is recommended. It is hoped that the objection to surgical intervention may be overcome. The best results in surgical tuberculosis are obtained by combined operative and conservative measures.—*Primäre Gelenkplastik bei Tuberkulose, J. Wieting, Centralbl. f. Chir., April, 1922, xlix, 589.*

Knee Joint Tuberculosis in Chinese.—Often the economic pressure is so great among Chinese patients that prolonged conservative medical treatment of joint tuberculosis is interdicted. These patients usually also are not seen by the physician until a late stage of the disease. Radical operation with enucleation of the joint and tight end-on mortising of femur and tibia at an angle of twenty-five degrees from full extension proved very satisfactory in 6 cases, bony union occurring in gratifying manner. When the general condition is poor, the knee lesions progressing and lung tuberculosis probable, amputation should be done. The presence of sinus is not necessarily a contraindication to operation.—*Treatment of Tuberculosis of the Knee Joint in China, T. Stearns, J. Bone and Joint Surg., 1923, v (old series, xxi), 437.*

Chronic Pulmonary Tuberculosis with Multiple Bone Lesions.—An unusual case is recorded, showing metastatic involvement of most of the ribs, the left clavicle, the frontal bone and the thyroid cartilage, resulting in multiple abscesses and spontaneous fractures of the diseased bones. The clinical history makes it evident that the bone lesions were secondary to the pulmonary disease, and metastatic rather than the result of direct extension through the chest wall. The bone lesions were especially unique in that rarefaction occurred with no evidence of new bone formation.—*Multiple Tuberculous Bone Lesions Complicating Chronic Pulmonary Tuberculosis, J. Rosenblatt, J. Am. M. Ass., July 21, 1923, lxxxi, 184.*

Symptomatology and Diagnosis of Renal Tuberculosis.—Renal tuberculosis is a common condition occurring at all ages, but most commonly between the ages of 15 and 35, according to operative statistics; many cases, however, never come to opera-

tion. Renal tuberculosis may occur in apparently healthy persons and, while other tuberculous lesions are present in the body, there have been autopsied cases in which the only detectable foci were confined to the kidney. For the diagnosis of the renal lesion, tuberculin tests are not important and may be dangerous; neither is the antigen reaction of any value. In the initial latent stage of the disease, as long as the original focus of infection has not broken through to the renal pelvis, and as long as no ulceration or other gross change has taken place in the kidney, it often happens that clinical symptoms are slight or absent. In a great number of cases the earliest sign is to be found in microscopic changes in the urine which contains tubercle bacilli, pus cells and erythrocytes with perhaps a trace of albumen. Symptoms and signs may be classified into three groups which are discussed in order. *1. Signs and symptoms from the kidney region:* Absence of such symptoms, temporarily or completely, is not rare, while in other cases they may vary from a slight sense of weight or pressure in the kidney region to a more or less severe sense of burning and pain, occurring continuously or in bouts. The pains may be most severe on violent movement or exertion, and are usually referred to the diseased side, although they are occasionally felt on the healthy side or both sides. They may be severe and colicky, due possibly to obstruction of the ureter by a blood clot or otherwise, but sometimes the ureter is found to be intact in spite of the colic. Symptoms from the kidney region may occur early or late. The objective, palpable signs referred to this region, like the symptoms, may be totally absent, but if there is pain on the diseased side there is usually also tenderness on pressure; tenderness may be elicited when there has been no pain. If the diseased kidney is enlarged or prolapsed it may frequently be palpable, but in some cases this kidney is small and shrunken while the opposite one is enlarged and palpable due to compensatory hypertrophy. *2. Symptoms from the bladder region:* In primary renal tuberculosis the bladder and ureter become, as a rule, infected early, and in most cases bladder symptoms occur earlier than kidney symptoms. In tuberculous cystitis there are no symptoms which are sufficiently characteristic to indicate the correct diagnosis by themselves; it is the course of the disease which is most characteristic, provided it is typical. In typical disease the first symptoms of cystitis are slight and insidious, and often pass unnoticed, but, despite remissions and periods of improvement in some cases, they usually gradually increase in intensity and do not disappear. Pollakiuria occurs without any apparent provocation, and gradually grows worse; it is usually the first symptom, and continues to be prominent. There may be a feeling of fulness in the bladder, sometimes without, but usually with pain. Nocturnal frequency may be marked, but usually this is more annoying by day. Pollakiuria may occur without pain but, usually fairly soon, pain is felt toward the end of micturition and immediately after it, and is usually characterized by a burning sensation referred to the urethra or the extreme end of it; it lasts only a short time and is not severe, although in old cases it may be intense. Tuberculous changes in the urethra cause pain at the affected site, but this may disappear following extirpation of the diseased kidney. Bladder symptoms may be typical and early, but for a long time in some cases they may be comparatively slight, while other and more troublesome symptoms force the patient to seek medical advice. *3. Changes in the urine:* As soon as renal tuberculosis has passed from its latent initial stage morbid changes are always demonstrable in the urine, even though they may be slight. The color of the urine may be normal, and it may be so clear that only on close examination can a slight turbidity be detected. But even at this stage the urine may contain masses of tubercle bacilli. It is rare to see a case in such an early stage unless some prominent symptom like hemorrhage has occurred. Later the urine is definitely turbid, and has an almost characteristic pallor; the quantity voided is often increased and it gives an acid reaction. Pus cells are always present in the urine in cases of renal tuberculosis; in early cases the quantity of pus is not large, but later it increases. Pus alone does not prove that the disease is tuberculous. Blood in microscopic quantities is usually present but this is not constant. Larger quantities sometimes appear, but usually do not persist. The source of the blood is usually the kidney, although bladder hemorrhages do occur. Albuminuria is usually present, but in most cases it is slight, about 0.05 to 0.1 per cent. The urine may at times be perfectly normal, while at other times it has shown morbid changes; this may be explained by a temporary blocking of the ureter on the diseased side. One or all of the above findings may be associated with a number of other diseases of the kidneys and bladder, and the only pathognomonic sign indicative of tuberculosis is the presence of tubercle bacilli in the urine. By centrifugation, staining and microscopic examination it is, as a rule, easier to demonstrate tubercle bacilli at a comparatively early stage of the disease than later, and they can

be found in at least 80 to 90 per cent of all cases. If they are not detected by direct microscopic examination, guinea pig inoculation may give the desired information. If the result is negative the inoculation should be repeated; if it is positive, the possibility of an elimination bacilluria should be borne in mind, especially if there is active and severe tuberculosis in some other part of the body. It is desirable to confirm the diagnosis of renal tuberculosis by catheterization of the ureters; this shows which kidney is diseased. If such catheterization shows pus and tubercle bacilli coming with the urine from only one kidney, then this kidney is the seat of the tuberculous changes. One should not wait for a functional deficiency of this kidney to be demonstrated, as this may not occur to a marked degree until late in the disease. If there is pus in the urine but no tubercle bacilli on microscopic examination, animal inoculation should be done; if there is no pus in the urine coming from one kidney then this kidney is not the seat of tuberculous disease. When there is aseptic pyuria the disease is tuberculous only in a certain proportion; but aseptic pyuria is rare in renal tuberculosis.—*The Diagnosis and Treatment of Tuberculosis of the Kidneys and the Urinary Tract, II. The Symptomatology and Diagnosis of Renal Tuberculosis, G. Ekehorn, Tubercle, June, 1923, iv, 393.*

Treatment of Renal Tuberculosis.—Purely symptomatic treatment is seldom justified except when there are special indications such as severe pain; all internal medicinal treatment has proved unsatisfactory and specific remedies like tuberculin may be injurious. Hygienic-dietetic treatment may produce improvement in symptoms but never true recovery. The only effective and rational treatment of renal tuberculosis that we now possess is operative, that is, nephrectomy. Other types of operation are rarely to be considered. Nephrectomy, properly performed, is not a very severe operation and should be done as early as possible. The wound in the abdominal wall is closed completely without drainage or tampons, and union occurs rapidly and without reaction; the best treatment of the ureter is to bury it. Before a tuberculous kidney is removed it must be ascertained that another kidney exists, that the other kidney is not tuberculous and that it is capable of doing the work of two. Freedom of the other kidney from tuberculosis must be ascertained by catheterization of the ureter on both sides and by examining separately the urine from the two sources. If the urine from one source contains neither pus nor tubercle bacilli, tuberculosis does not exist at this source. Late in the disease the ureter on the diseased side may be inaccessible to catheterization, but sometimes the ureteral orifice is obstructed on the healthy side. If, before catheterization, the bladder urine contains tubercle bacilli, and if urine from one ureter shows no tuberculous changes and if the patient is a woman, it may be safely assumed that the other kidney is tuberculous and it is justifiable to proceed at once with nephrectomy. The same rules apply to most male patients if a focus in the genital tract can be ruled out. If there is difficulty in catheterizing the ureters, rest in bed for a week or two with bladder treatment may remove the difficulty. It is not possible with certainty to determine which kidney is affected from the cystoscopic appearance of the base of the bladder. Other measures that have been proposed as substitutes for cystoscopic ureteral catheterization, when this fails, have not proved entirely satisfactory. The safest and most suitable procedure under these circumstances is to make an exploratory incision, and to examine one kidney before nephrectomy of the more diseased kidney is undertaken. Exploratory incision on one side and nephrectomy on the other are best done at the same time. The kidney to be examined is freed, but neither nephrectomy nor decapsulation is done; the renal pelvis and upper part of the ureter are exposed, so they can be seen and palpated. If findings on this side are positive the case is regarded as one of bilateral renal tuberculosis; negative findings do not rule out tuberculosis if it is slight, but, if in such cases there is advanced disease in the other kidney, it should be removed. When Casper finds it impossible to catheterize the ureters, he cuts down on the worst kidney, clamps its pedicle, and then determines the function of the other kidney following intramuscular injections of indigocarmine and phloridzin; but this does not prove whether or not the other kidney is tuberculous. A patient's general condition may contraindicate nephrectomy, and it is particularly important to consider the state of the kidney. Catheterization of the ureters is essential if the functional capacity of each kidney is to be ascertained, but in advanced cases in which this information is most desired such catheterization often fails. However, in ordinary cases of renal tuberculosis functional tests are superfluous and valueless, and they need not be done unless there are special indications. True renal insufficiency in this disease occurs very late in the "healthy" kidney. If, on catheterization of the ureter of the "healthy" kidney, the urine is found to be practically normal, and there is no sign of severe nephritis (a slight toxic nephritis is common), and if the

concentration of the urine is practically normal, it is certain that this kidney is not insufficient, although its functional capacity may be reduced. Even if the concentration of salts in the urine is low, renal insufficiency does not usually follow nephrectomy, and in most cases the condition of the remaining kidney improves. Care must be taken in the presence of marked nephritis, or amyloid disease of the kidneys, but slight nephritis is not a contraindication, and even marked nephritis may not get worse following operation. The author has excised the more diseased kidney in a number of cases in which the involvement was bilateral; exploratory incision and examination of the other kidney were always done first, but tuberculosis could not be completely identified in this kidney in every case. The removal of the worst kidney proved uniformly beneficial. When both kidneys are involved, the patient's condition is good and the ureters can be catheterized, functional tests should be carried out. If the better kidney functions well and exploratory incision shows that involvement is not extensive, the other kidney may be removed; but if both kidneys are equally affected operation is out of the question. If the patient's condition is good and bilateral renal tuberculosis is suspected but ureteral catheterization is impossible, ordinary physical examination usually indicates where the disease is more advanced. The healthier kidney is explored and, if found tuberculous, the more diseased kidney should be removed if it is enlarged and pyonephrotic, if there is retention and if it causes constitutional symptoms and injures the other kidney. In such cases renal insufficiency need hardly be feared because the less diseased kidney has already taken over the functions of its fellow. The worst kidney may be removed or must be removed when it is so diseased that it can no longer be considered useful. Secondary infection is not necessarily a contraindication to operation. With increasing knowledge of renal tuberculosis and earlier diagnosis, results of operation have steadily improved, the direct mortality having been reduced to a minimum. Before 1911, Israel showed that more than three-quarters of 1,000 patients operated on were permanently saved. Since then the results have improved, and for uncomplicated cases, operated on early, the prognosis is very good. If the disease is not too advanced, tuberculosis of the bladder, as well as of the ureter, heals without any treatment after operation. In some cases, however, local treatment may be necessary, before or after operation. Irrigations and instillations of silver nitrate are too irritating, and it is better to use the sublimate or oxycyanide of mercury in dilutions weak enough to avoid pain. Irrigations should be done with care, and the amount of fluid introduced must not be large enough to provoke pain or tenesmus. In some cases local operative treatment may be necessary, the operation of *exclusio vesicae* being the best.—*The Diagnosis and Treatment in Tuberculosis of the Kidneys and the Urinary Tract, III. The Treatment of Renal Tuberculosis, G. Ekehorn, Tubercle, July, 1923, iv, 444.*

Renal Tuberculosis Simulating Bright's Disease.—Three cases, with characteristic findings of Bright's disease, had a closed kidney tuberculosis in which the tubercle bacillus caused a diffuse infiltration of the parenchyma. Clinically, these cases can be considered tuberculous nephritis with hypertension.—*Tuberculose rénale à forme de mal de Bright, G. Rousset, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 477.*

Addison's Disease and Amyloidosis.—It is generally agreed that the vast majority of cases of Addison's disease are associated with bilateral destructive changes in the adrenal glands. Most often the lesions are tuberculous; next come atrophic changes due to inflammation and hemorrhage; less commonly, tumors; very rarely, gummata, thrombosis and amyloid changes. While amyloid infiltration of the adrenals is a fairly common finding in persons without evidence of Addison's disease, the association of the two is exceedingly rare, only two cases having been found in the literature, those of Bittorf and Schutz. Wiesel has held to the belief that Addison's disease is always dependent upon lesions of the chromaffin system, whether within the medulla or elsewhere, but typical cases have been reported in which the cortex was severely involved while the medula remained intact. Fahr and Reiche concur in what appears to be the most satisfactory opinion that destruction of either part of the glands is likely to be followed sooner or later by Addison's syndrome, because it seems likely that toxic split-protein products are taken up by the cortex and supplied to the medulla, which forms adrenalin. The probable reason for the rarity of the syndrome, even when the cortex shows amyloid deposits, is that there is not complete cell destruction but merely atrophy. In the case here reported the amyloidosis apparently resulted from a large hypernephroma. In the cortex of both adrenals there was deposition of a glassy material in streaks, giving the amyloid reaction. The medulla was scanty, but well preserved.—*The Relation of Addison's Disease to Amyloidosis, M. McCutcheon, Amer. J. M. Sci., August, 1923, clxvi, 197.*

Microscopic Changes in Testis of Young with Pulmonary Tuberculosis.—While the testicles in severe cases of pulmonary tuberculosis are usually intact, microscopically there are morbid changes. In the testes of 28 cases of phthisis there were found small fusiform interstitial cells without lipoid or pigment in the interstitium and with only a few Leydig cells. This is an index of retarded development. Frequently there is a connective tissue increase of the interstitium, the former in younger, the latter in older people, so that it seems that the latter condition develops from the former. The clinical results of these changes are disturbances of spermatogenesis.—*Mikroskopische Hodenbefunde bei jugendlichen Tuberkulösen (ausschliesslich der Spermangoitis obliterans), E. Brach, Virchow's Arch. f. path. Anat., 1922, ccxxxix, 68.*

Tuberculosis and Condition of Vagina.—Among 60 cases of manifest pulmonary tuberculosis there were 21 with normal menstrual cycles, 39 with disturbances (10 with polymenorrhoea, 10 with oligomenorrhoea, and 19 with amenorrhoea). With increased disturbance of ovarian function the vaginal flora multiplies and inflammatory changes of the vaginal mucous membranes increase. The more advanced and unfavorable the pulmonary condition is, the greater is the vaginal flora. One of the main causes in the changes of the vaginal flora and the anatomic substratum of the vaginitis is the glycogen decrease of the vaginal epithelium, occasioned by the increasing cachexia. —*Scheidenmikrobismus und Tuberkulose, unter besonderer Berücksichtigung der Genitalfunktion, O. Wolfring, Centralbl. f. Gyn., July, 1922, xlvi, 1086.*

Ascending Uterine Tuberculosis.—A case of tuberculosis of the uterus and adnexa in a 38-year-old woman with the possibility of an ascending infection is described. The ovaries were intact. On the right side there was an open salpingitis with mild pelviperitonitis; on the left a hydrosalpingitis without peritoneal involvement.—*Considerations anatomiques sur un cas de tuberculose utéro-annexielle, G. Flayols, Dissertation, Montpellier, 1921, Abstr. from Centralbl. f. d. ges. Tuberk-Forsch., February, 1923, xix, 238.*

General Treatment of Tuberculosis.—Tuberculosis is the only grave disease which we expect to influence by what seem comparatively slight and unimportant remedial measures. The generally admitted reason for this is the almost general tuberculization of civilized communities. Their contrast with the tuberculosis of savage or primitive races exposed to first infection is marked. In the latter, the adult, equally with the young child, falls a prey to acute and fatal forms of tuberculosis and infection varies directly with the degree of exposure. In civilized communities cases of manifest tuberculous disease are cases of failure in immunization in a minority of the infected, which failure may be so temporary and slight that relatively trivial measures are sufficient to enable the resistance to reassert itself and triumph. We are helping the patient, not attacking directly the tubercle bacillus, and there is no routine treatment applicable to all cases. As respects skill in diagnosis and conditions of hygiene, discipline and instruction, as well as escape from family cares and distractions, the advantage is with the sanatorium as against home treatment. Tuberculosis is always unique in that the physician's task must be to anticipate and prepare for the regulation of life for perhaps an indefinite period. No matter how great his skill or prestige, his influence will wane when the patient removes himself from his care unless the reasons for the precautions advised are made clear. The patient should obtain some idea of the pathological conditions in his case and the object sought, and taught something of the way of the tubercle bacillus. One of the greatest difficulties in organizing a sanatorium staff is to develop properly this element of instruction. The assistants must be so sincerely interested in their patients' welfare that they will take extra pains to influence and instruct. First of all, the physician must satisfy the patient as to his competence; then he must be able to persuade and convince. It is better to commence with the truth, except in dealing with hopeless moribund cases, for eventually the truth will come out. Patients who have a chance of recovery should be prepared for the probably necessary length of treatment. Brutal and snap statements as to prognosis, however, are to be avoided, for they may prove wrong. An important point is that the physician must show the sincerity of his belief in his rules by never ignoring infractions. Stuffing of food as a routine practice has been given up by the physician, but not as yet by the patient. When dietetic deficiencies are made up, the daily ration should be reduced. The majority of patients, however, can be at once put on diets suitable for resting individuals. Most of the miseries of the tuberculous patient are due to overeating or improper selection of foods. Too much fat is inadvisable. Rest is indicated for the lesion alone, and for the general condition. Deep breathing is analogous to squeezing a boil. A long period of careful observation must precede

any attempt to produce "self tuberculinization." Tuberculinizing a lesion is about as safe as attempting to control high voltage electricity by guess or with rudimentary apparatus. Bushnell despairs of the future of him who constantly seeks additional concessions. While no injury may result, the margin of safety is too narrow. Rest is also important to prevent the tuberculosis from spreading. Many patients need to be taught how to rest, with complete relaxation. It is inexcusable to permit harmful exercise or amusements, on the plea of homesickness or discontent. It is important to teach nervous persons to control their emotions. It is important to control useless cough. Docility has an important bearing on prognosis. Much can be done in the daily visits to banish anxiety as to trivial symptoms. Auto-psychotherapy, in which the patient is taught to ignore unfavorable sensations and suggest those of strength and well being, is worthy of consideration after removable injurious influences have been done away with. Better instruction of the general practitioner in physical diagnosis is a prerequisite in the campaign against pulmonary tuberculosis.—*The General Management of Tuberculosis, G. E. Bushnell, Boston, M. & S. J., September 13, 1923, clxxxix, 363.*

Symptomatic Treatment of Tuberculosis.—Although most tuberculosis specialists and sanatoria have little or no confidence in drugs generally, it is not so sure that some general medication may not have value, at least psychically. In times past the three most popular were codliver oil, hypophosphites and alcohol. At any rate, many drugs ameliorate more or less distressing symptoms. The following symptomatic indications are considered: 1. *Cough:* Discipline and training in the suppression of unnecessary and unproductive cough are recommended. There are, however, many cases in which the respiratory tract becomes so irritated and sensitive as to interfere with the patient's rest. Paroxysms of coughing may result in emesis, thus affecting nutrition. One at first tries such simple remedies as lactucarium, acacia, flaxseed tea, and sedative syrups. Inhalations or sprays may relieve irritation of the upper respiratory tract. Occasionally creosote produces striking benefit. If all these fail, some form of opiate will have to be employed. Codeine, in one-eighth or one-quarter grain doses, is most desirable, if possible given only at night, or intermittently. For the so called emetic cough, a good practice is to give the patient, on awakening, a hot drink, which will usually excite coughing and elimination of accumulated secretions, after which breakfast may be taken without losing it. Good results have been obtained from a few drops of chloroform well diluted, or cocaine, before meals, and from menthol, in solution, after eating. Codeine or heroin, an hour before meals, is the last resort. If there is laryngeal irritation, medicated vapors or sprays may afford relief, such as menthol, eucalyptus, camphor, or creosote, in oils. 2. *Hemoptysis:* As James Jackson long ago said, "rest of body and mind and holding the tongue, are quite as important . . . . as the medicinal articles," yet the frightened patient and his entourage demand further treatment. Hot drinks should be avoided, but otherwise there is no reason why the food should be cold. At first, however, food should be given sparingly. Ice is of doubtful value. A full dose of salts in the first twenty-four hours is recommended. To check coughing which may dislodge clots, an opiate may be required, preferably codeine. Morphine is apt to depress the reflexes too much and thus lead to aspiration pneumonia. The only efficient means of stopping an overwhelming hemorrhage is artificial pneumothorax, which, as Murphy suggested, can be done with a subcutaneous needle in emergency, if the pleura is free. 3. *Fever:* This is the result of toxemia from an active pulmonary lesion, and the one great means of checking it is absolute bedrest. If it still persists, with evident rapid progress of the disease, artificial pneumothorax affords a chance of turning the scales. Pyramidon may be employed if the fever causes great general malaise, or leads to persistent anorexia. A single dose of five or ten grains is given in twenty-four hours. It may be combined with camphoric acid as pyramidon acid camphorate. 4. *Night sweats:* The following remedies are suggested: a glass of milk with several teaspoonfuls of brandy on retiring; bathing with water and vinegar; agaricin, one-tenth grain an hour or two before bedtime, and camphoric acid, 20 to 30 grains, as pyramidon acid camphorate. 5. *Digestive disturbances:* Proper arrangement of the dietary with avoidance of overfeeding is of first importance. Fishberg recommends creosote for anorexia. For constipation, if drugs must be used, cascara, agar agar, and compound licorice powder, are among the best. Nutrition should be favored by appetizing menus. 6. *Pain:* Pain or hyperalgesia referred to the chest or shoulder may be troublesome. Many of these patients, however, are neuropathic. External applications should first be tried, such as mustard paste, iodine, heat and dry cupping. Internally the salicylates, aspirin or phenacetin, may be tried. Opium is rarely needed. 7. *Depression of spirits:*

The personality of the physician can do more to relieve ennui and mental depression than anything else. A heart to heart talk is needed at times, and sometimes tenderness, sometimes firmness, is required. Occupational therapy has lately come into prominence. The reading of poetry or simple tales, simple games and light study may be valuable. But more important than any of these is the physician himself, as thousands of former patients of Trudeau and King can testify. As Trudeau has said, the patient has no means of judging of the physician's intellectual attainments, but it is the faith that radiates from his personality that he seizes. Any encouragement will help to keep up his spirit and carry him through the long days of illness and suffering to recovery, or it may dispel much of the darkness and despair which brood over the end of life. —*The Symptomatic Treatment of Tuberculosis, E. O. Otis, Boston, M. & S. J., September 13, 1923, clxxxix, 374.*

Sanatorium Treatment.—The original purpose of the sanatorium was for the treatment and cure of tuberculosis, but in a broader sense its real value rests in its educational program. The number of arrested cases credited to it is discouraging, and the number cured negligible; but the principles there instilled are carried by the trained and educated, thoughtful ex-patient to the community to which he returns. The sanatorium has not been, however, the source of direct information and assistance that the general hospital has been with its free clinics and modern methods of diagnosis. Its isolation, inadequate medical staff, and multitudinous duties of its superintendent, may explain its shortcomings in the past. When, however, it reaches the people as the general hospital has, in an intimate personal way, they will seek its resources more promptly and not look upon it with suspicion and as a place of last resort. The admission of suspects for observation and diagnosis is a needed change. The free consultation clinics held by the Massachusetts State Department of Public Health have revealed the difficulties which beset the practitioner in arriving at a diagnosis. The sanatorium examiner frequently finds himself unable to make a diagnosis from a single examination, and often is still undecided after several examinations. No disease requires so much teaching and patience on the part of the physician as tuberculosis. An early sanatorium training has many educational advantages. Most of the early clinical forms of tuberculosis are curable under a proper regimen continued sufficiently long. It is amazing how little of what has been written about the disease has been absorbed or applied generally. Food fills a large place in the minds of the majority. The teaching of twenty years ago still lingers with the laity and even the profession. Probably more patients are harmed by overeating than undereating. The omission of extra lunches at Rutland has been followed by an average increase of nearly two pounds per patient as compared with the time when such lunches were a routine practice. There has also been a reduction in the number of digestive disturbances. Rest is the bedrock of tuberculosis therapy and the one remedy that all will attempt to evade if they can devise some excuse. To this fact may be attributed a large proportion of relapses and failures. There is no danger in prescribing too much fresh air and rest; there is some hazard in too much food; and too much activity will retard convalescence or undo the results of months of right living. The right mental attitude is most essential; it is in some measure a cultivated state of mind and the product of heredity, teaching, suggestion and observation. The consumptive who is to win against a destructive process, with a tendency to a fatal ending, must possess intelligence, will power and determination, and be able to coöperate. For this some knowledge of the disease and reasons for therapeutic measures must be had. His ideas must be systematized and crystallized, especially as they apply to him personally. A rudimentary course of instruction in the etiology, pathology, symptoms and treatment, combined with the practical experience of sanatorium life, does not result in morbid brooding or apprehension. The whole future of the consumptive depends upon readjustment of his life, and weeks and months should not be wasted by a delay in instruction in the habits of living which must be maintained for months or years if permanent results are to be obtained.—*The Sanatorium Treatment, E. B. Emerson, Boston M. & S. J., September 13, 1923, clxxxix, 369.*

Sanatorium Benefit.—This was the only feature of the National Insurance Act of 1912 to meet with complete approval by the medical profession. However, as in an army, so in a profession, the main factor in the success of any evolution lies in the hands of the rank and file, and the staff work in the tuberculosis campaign failed in so far as it did not take sufficient account of the general practitioner. It is he who first sees the early signs of tuberculosis, and he ought to have been encouraged to send the atient to the right quarter at once. By the early signs is not meant the subtle and ill-defined

niceties and refinements of diagnosis, which must remain in the province of the specialist, but the gross signs and symptoms too frequently passed over and neglected. The following factors undoubtedly contributed to the relative ineffectiveness of the movement: 1. The salary of 500 pounds per annum with no definite increase. 2. Administration by M. O. H.'s instead of the tuberculosis officers. 3. Local apathy and general antagonism of the profession to the Insurance Act. 4. Uncertainties of future prospects in this pioneer movement, and the lack of scope for tuberculosis as a specialty outside the narrow limits of the sanatorium. Regarding the salary question, no public authority could have offered more at the outset, but this should not have prevented their appreciating good men. Unfortunately public authorities are mostly opportunists, and the local authorities generally failed to increase the pay and position of their officers. The second point is a matter of divergent viewpoints of the M. O. H. and the clinician. The former cannot be an "omnibus expert," and it is generally conceded that he cannot be a clinician. His administrative functions might well be delegated to a good business layman. There should not exist the present antagonism of ideals between him and the practitioner. The mere compilation of a mass of statistics, never properly classified and used, is a waste of money and time. If there ever were prospects for individual tuberculosis officers, this time is long since past, as sanatorium benefit is now merely a byproduct of public health. The same man in many parts of the kingdom is medical officer of health, school medical officer, venereal specialist, tuberculosis officer, oculist, etc. Such a man would be better off in private practice, and the nation would be better off. The lack of future prospect to attract ambitious men is a detriment to the service. With few exceptions, all well known chest specialists are general consultants as well, and outside sanatoria the pure tuberculosis specialist does not exist. As long as the above mentioned difficulties remain, sanatoria will be open to severe criticism. Nevertheless, properly run and staffed sanatoria represent the most marked advance in the treatment of tuberculosis. Pseudo-sanatoria, which are nothing more than lodging houses for consumptives, bring sanatoria into contempt and are breeding grounds for neurotics. Notification of tuberculosis is not helping us to get hold of the early case, and has brought much unreasonable restriction; while its benefits are questionable. The technique of sputum examination at public expense could well be perfected. Artificial pneumothorax could well be used more, or at least borne in mind, and every sanatorium should have facilities for this treatment, and tuberculosis officers should know how to apply it. Even tuberculin deserves more consistent trial than it has had. The brightest spot in sanatorium benefit is the treatment of nonpulmonary cases and every authority should possess a surgical consultant. The excellent work of Gauvain at Alton has prompted the Lancashire County Council to send its tuberculosis officer for a course of training. Open air schools and convalescent homes are an integral part of the pretuberculosis scheme, and full time nurses are essential. Lantern slide lectures should be given in the large centres, and, if it were practicable, patients' relatives should receive financial help. Sanatorium buildings should be especially designed, not adapted, and should be of permanent construction. It might pay to get tuberculosis clinics attached to more of the general hospitals, and would be advisable to have sanatoria built and run by the hospitals, thus creating a better atmosphere and giving the sanatoria the benefit of the hospital consultants, including an expert laryngologist and radiographer.—*Ten Years' Experience of Sanatorium Benefit, J. D. Macfie, Tubercle, August, 1923, iv, 496.*

Results of Treatment of Pulmonary Tuberculosis in Japanese Sanatorium.—The Tsuyazaki Sanatorium is a government sanatorium for first-stage cases. The statistics run from January, 1914, to June, 1922. A total of 525 cases were admitted during this time, and the figures are given according to age, occupation, mode of infection, time from first appearance of pleurisy to pulmonary symptoms, pulmonary hemorrhages, seasonal relations, etc. Treatment resulted in improvement in 96.2 per cent, 3.0 per cent remained stationary, 0.8 per cent became worse, and not a single death is recorded among the 525 cases treated during eight and a half years.—*Statistical Report on the Results of the Treatment of Pulmonary Tuberculosis of the First Stage in the Tsuyazaki Sanatorium, Aishiro Minohara, Kekkaku Zassi, January, 1923, no. 7, Abstr. from Japan Medical World, July, 1923, iii, 168.*

Home Treatment of Pulmonary Tuberculosis.—A first requisite is confidence on the part of both patient and family that the doctor knows what he is doing or talking about, that he is sincere, truthful and frank, that his personal interest in the patient is at least equal to his professional interest in the case, that he has faith in the possibility of arresting the disease, and that he can plan and supervise a campaign and

inspire the patient to do his part. As soon as the diagnosis of active tuberculosis has been made and accepted, the training and treatment of the patient should begin. The patient's family should be called into council and a survey of all conditions bearing on the case gone into. Difficulties and problems should be squarely faced and solved. It must be understood that the doctor is in supreme command, but he should lay down but few rules and regulations. The most permanent and happy results are impossible unless the patient has a normal interest in himself and life in general. When he feels he is no longer needed and there is nothing left for him to do, he has lost faith in himself and his recovery. The practical value of a hobby during convalescence has been many times proved. Nature study, or the keeping of a scrap book with articles or quotations of interest, is helpful. Experience has proved beyond doubt that nothing can be considered a safe substitute for prolonged rest in bed when there are unmistakable signs or symptoms pointing to active disease. The family must be worked with, for the individual is not permanently safe from relapses until his family conditions are settled, peaceful and helpful. We must also succeed in permeating our institutions with the family spirit found in the best home life.—*The Home Treatment of Pulmonary Tuberculosis, E. T. Shields, Boston M. & S. J., September 13, 1923, clxxxix, 372.*

Bacillus Acidophilus Milk in Tuberculosis.—It is rare that a patient with pulmonary tuberculosis does not develop, at some time, gastrointestinal complaints. While some of these complaints are of minor importance, other patients develop symptoms of definite motor and secretory gastric disturbances, as well as intestinal symptoms of diarrhea, severe constipation and generalized abdominal pain. A few of these have definite tuberculous or nontuberculous lesions in the abdomen, and in some cases diaphragmatic irritation may cause reflex abdominal symptoms; but in most instances the effects can be fairly regarded as those of the general toxemia of the disease. Whether due to actual intestinal tuberculosis or to a severe toxemia, these conditions are often persistent and intractable, and they may affect prognosis unfavorably. In all cases in which symptoms suggested the possibility of an intestinal tuberculosis, even though roentgen findings were negative, heliotherapy and quartz crystal irradiation were instituted. In many cases, however, it is impossible to arrive at any definite diagnosis of the underlying gastric or intestinal condition, and treatment must be purely symptomatic and usually proves most unsatisfactory. On this account it was decided to try the administration of *Bacillus acidophilus* milk cultures, manufactured according to the technique of Rettger and Cheplin. The success of the implantation was controlled by stool examinations made approximately weekly, the percentage of gram-positive rods being determined, as well as the percentage of *Bacillus acidophilus* colonies found on plate cultures from the stool. The successful manufacture of the acidophilus milk is very difficult. Three groups of patients were selected for treatment: (1) those having diarrhea of a more or less chronic type, excluding the occasional diarrhea that followed a gastrointestinal upset; (2) chronic digestive disorders characterized by rather indefinite symptoms of gastric and intestinal gas, nausea and vomiting, sensation of fulness and discomfort and loss of appetite; and (3) obstinate cases of constipation. In the first group were several cases with probable intestinal tuberculosis. The 6 patients of this group were given, as a rule, one quart of acidophilus milk a day (one patient received one pint) for periods ranging from ten days to seven months. Diarrhea was relieved in all cases and usually other symptoms improved also; in three cases there was no return of symptoms when the treatment was discontinued. In the second group, which included 13 cases, one quart of the milk was given daily for from twenty-two days to one year. Results were variable and in only one instance was the improvement marked; in 4 cases there was no improvement. In the third group of 4 constipation cases, one quart of the milk was given daily with 50 to 100 gm. of lactose. Improvement was noted in 3 cases, but it was found necessary to adjust carefully the quantities of lactose and acidophilus milk in each case. Laboratory studies showed no permanent or consistent change in the intestinal flora of patients under treatment. Most of the patients who improved did so very soon after the institution of treatment and long before any material change in the intestinal flora could be demonstrated. Many of those showing the greatest improvement never evidenced any consistent alteration toward the acidophilus flora, and, on the contrary, 5 unimproved cases evidenced a fairly satisfactory laboratory picture. In two cases with severe intestinal symptoms ordinary buttermilk effected relief. It is felt that whatever improvement occurred in this small series of patients was due probably to some other factor than the actual transformation of the common intestinal bacteria into the acidophilus type of germ. Whether the value of acidophilus milk lies

in its acidity, the coagulated protein, or in some other chemical property, is difficult to answer; but that it is of value to many patients suffering with various gastrointestinal disorders seems to be shown by this study. The work of others with *Bacillus acidophilus* is reviewed. It seems quite possible that, while constipation is relieved by some bacterial reaction dependent on viable germs the diarrhea and digestive disturbance group are more benefited by some biochemical reaction not dependent on a transformation of the intestinal flora to an aciduric type.—*The Use of Bacillus Acidophilus Milk in a Tuberculosis Sanatorium, W. H. Morriss, J. Am. M. Ass., July 14, 1923, lxxxi, 93.*

Nutrition in Pulmonary Tuberculosis.—An exhaustive summary of all recent ideas on nutrition in pulmonary tuberculosis, including protein, fat and carbohydrate metabolism, besides the views on mineral metabolism under which are considered the calcium and chlorine factors. An addendum on the Pirquet feeding system is appended.—*Die Lehre von der Ernährung bei Lungentuberkulose, Schulte-Tigges, Centralbl. f. d. ges. Tuberk.-Forsch., December, 1922, xix, 1.*

"Rest Breathing" in Pulmonary Tuberculosis.—A further discussion of controlled and diaphragmatic respiration as an adjuvant therapeutic measure.—*Rest Breathing as a Physiological Adjuvant in Pulmonary Tuberculosis, S. A. Knopf, Brit. J Tuberc., July, 1923, xvii, 124.*

Surgical Treatment of Pulmonary Tuberculosis.—The immense amount of work done on artificial pneumothorax is evidence of its value. Besides the mere results of treatment, it has brought about considerable progress in our knowledge and thrown light on many anatomic, physiological, biological, diagnostic and therapeutic problems. When considering its results, it has to be borne in mind that it and other substitute measures are being used only in those advanced cases which ordinarily have a very poor prospect. Likewise, both pneumothorax and collapse operations depend, to a great extent, upon a very scrupulous technique and a familiarity with their indications and contraindications. Above all, the results have to be judged according to the anatomic and physiological possibility of deriving full benefit from the treatment. A comprehensive view of 211 third-stage cases (two to twelve years after discharge) shows a lasting positive result of pneumothorax in 38 per cent of all cases in which pneumothorax of any noteworthy extent could be established. The following classification of the cases into groups shows the baneful effect of pleural adhesions: *Group I:* Of 47 cases with complete pneumothorax without adhesions, 33, or 70.2 per cent, were able to work, and 11, or 23.4 per cent, died from tuberculosis. *Group II:* Of 42 cases with complete pneumothorax, but with localized extended adhesions, 14, or 33.3 per cent, were able to work, and 28, or 66.7 per cent, died from tuberculosis. *Group III:* Of 45 cases with incomplete pneumothorax but larger adhesions, 5, or 11.1 per cent, were able to work and 39, or 86.7 per cent, died from tuberculosis. *Group IV:* Of 77 cases with universal adhesions, 9, or 11.8 per cent, were able to work, and 63, or 81.8 per cent, died from tuberculosis. It is no wonder, then, that extreme attempts have been made in cases with adhesions to provide for the diseased lung such conditions of collapse as are present in a free pneumothorax. *General indications for pneumothorax:* When a case of advanced tuberculosis shows no improvement or hope of lasting cure by ordinary sanatorium treatment or special remedies, collapse therapy is considered. The first method tried is always the simplest—artificial pneumothorax. If adhesions are not extensive and the lung collapses completely, this is sufficient. The optimum pressure and interval between inflations are settled according to the clinical observations. The duration of treatment is fixed individually, but as a rule it is maintained at least three to five years in order to avoid relapse. When treatment is being discontinued, the patient is kept under close observation. Should any complication occur, such as a pleural effusion, special care is taken to avoid injurious effects. If there are indications for evacuation of fluid, this is performed in combination with successive insufflations. Effusions, so treated, do not ordinarily influence the result of treatment. *Treatment of localized extended adhesions:* If, in spite of the establishment of the largest possible pneumothorax, the clinical result is a failure, an attempt is made to remove the adhesions to overcome their injurious influence. The only method of endopleural operation recommended is that of Jacobaeus. It has been adopted since 1918, and the procedure is considered of paramount value in a limited number of cases with string-like or membrane-like adhesions. In order to ascertain its feasibility in any case, a thoracoscopy is first performed. The ease or difficulty of the operation varies greatly. Apical adhesions are usually difficult to reach, while lateral ones are easily dealt with when extended to the utmost by the pneumothorax. It is

not deemed advisable to cauterize surface adhesions, as the cauterization of lung tissue involves the risk of hemorrhage and the opening of tuberculous foci and cavities, with infection of the pleura. This last complication is the most serious. With the use of a red, weakly glowing cautery, hemorrhage is unlikely. Jacobaeus has employed this method in 90 cases, Gravesen in 35. Of the latter series, it was technically successful in 22, and 17 of these derived lasting clinical benefit. None of the technical or clinical complications is of such gravity as to warrant abandoning the method in suitable cases, but it demands much practice in handling the instrument, and good surgical judgment. In unsuitable cases showing no lasting improvement under pneumothorax, other methods of collapse are considered. *Thoracoplasty:* Since 1916, thoracoplasty has been employed at Vejlefjord in 110 patients, of whom 105 had pulmonary tuberculosis. On account of the greater risk and the irremediable conditions involved in thoracoplasty, a more pressing need of collapse and a more reliable condition of the better lung are deemed essential. The general condition of the patient and other complications seem to claim more deliberation than is the case with pneumothorax, lest thoracoplasty get a bad reputation. The question of operation decided, there are two further considerations: Should a partial or complete thoracoplasty be done? Should the operation be performed in one or more stages? In general, a complete thoracoplasty is preferable, but the plan may be modified in individual cases. With regard to the number of sittings, one must individualize, considering the general condition of the patient as well as his lungs. A weakened and toxemic patient with a rapid pulse is always operated on in two stages. In general, if there is doubt, the two-stage operation is preferred. In addition to local anesthesia with novocaine-adrenalin, a very light ether anesthesia is used. Of the 105 tuberculosis patients operated on, 9 died from the operation, 64 obtained a positive result (43 cured or much improved), and 32 derived no benefit, most of them dying later. In 41 cases tubercle bacilli disappeared permanently from the sputum. Of 69 patients discharged more than two years ago, 31 (44.9 per cent) were recorded as fit for work. *Other special procedures:* Where a sufficient collapse was not obtained with simple thoracoplasty, the plan has included a resection of the anterior ends of the upper ribs (except the first). Even this has been insufficient in some cases and, in a few instances, extrapleural apicolysis has been performed. While one or two good results were obtained, it is not believed that this method has any large field of indication as compared with thoracoplastic resection. Phrenicotomy as an additional measure was not tried.—*Discussion on the Present Position of the Surgical Treatment of Pulmonary Tuberculosis, J. Gravesen, Brit. M. J., September 22, 1923, no. 3273, 506.*

Artificial Pneumothorax.—The results recorded are based on the observation of 600 cases during a period of twelve years, with over 12,000 inflations. The material consisted of 85 cases of moderately advanced, and 515 of far advanced pulmonary tuberculosis, classified into eight groups, as follows: 1. Fibrocaseous tuberculosis, 194 cases. 2. Fibrocaseous cavernous tuberculosis, 177 cases. 3. Primarily cavernous tuberculosis, 52 cases. 4. Severe acute infiltrating, caseous pneumonic and bronchopneumonic forms, 39 cases. 5. Tuberculous pleuritis with effusion, 20 cases. 6. Severe and uncontrollable hemoptyses, 4 cases. 7. Bilateral fibrocaseous cavernous tuberculosis, 30 cases. 8. Desolate bilateral ultimum refugium, 84 cases. The records reveal that, out of 453 patients with fibrocaseous and fibrocaseous cavernous types of disease, 356 had disease in the opposite lung which was readily demonstrable, and in 253 amounted to fibrocaseous infiltrations and disseminated bronchogenic extensions. To reduce the error in estimating end-results to a minimum, the study was divided into three epochs, as follows: 1911–1914, 1915–1918, and 1919–1922. Patients were not classified as "clinically well" until they had remained in this condition for one year. Follow-up work was facilitated by the fact that most of the patients were permanent residents of the Northwest. Those cases in which the period of treatment of observation was too brief to warrant reliable conclusions were excluded. The records include the reëxamination of about 5000 roentgenograms. The character of the lung compression was described as: 1. Satisfactory compression, compression of sufficient degree to eliminate the lung as a source of symptoms; it is not synonymous with total collapse. 2. Partial or unsatisfactory compression. 3. No free pleural space. Of 600 cases selected for treatment, 235 fell in the first group, 245 in the second and 120 in the third, a proportion roughly of 2 : 2 : 1. Of the entire series 149 patients are clinically well, and of these 114 were satisfactory compressions, 28 partial compressions and 7 had no free pleural space. While a partial pneumothorax is not attended with entirely satisfactory end-results, it may be decidedly beneficial, holding the disease in abeyance and preventing extension; against 15.5 per cent clinically well in this group

there were only 5.5 per cent clinically well in the group with no free pleural space. The end-results are likewise unfavorably affected by the inclusion of 56 partial compressions in desolate bilateral cases, of which 49 died, and 17 partial compressions in severe acute forms, in which 13 deaths occurred. The effects on fever were usually striking, 152 out of 203 febrile patients who obtained satisfactory compression (about 75 per cent) becoming afebrile. Satisfactory compression also caused disappearance of tubercle bacilli from the sputum in 123 out of 176 patients, or about 70 per cent. Disappearance of tubercle bacilli occurred in only about 25 per cent of the partial-compression group, and 15 per cent of the group with no free pleural space. Disease in the other lung cannot, without qualification, be regarded as a contraindication. Many of those classified as "clinically well" or "arrested ambulant" had extensive lesions in the untreated lung; it may be said, however, that fibrocaseous lesions involving the upper portion offer generally a more favorable prognosis than disseminated bronchogenic extensions into the lower half. If one has to deal with a very active process, it is better to allow this activity to subside somewhat before instituting pneumothorax treatment. Meanwhile, the danger of adhesions forming may be eliminated, in many cases, by introducing only sufficient gas to separate the lung from the chest wall, and at the same time observing the behavior of the opposite lung. Regarding tuberculous complications, 94 patients had a well defined tuberculous laryngitis before treatment, but in only one case was it the cause of failure. It does not contraindicate pneumothorax unless so severe as to interfere with nutrition, but on the contrary almost always improves coincidently with the pulmonary improvement. Tuberculous enteritis is more serious, and was a cause of failure in 17 out of 70 cases in which it existed. *Complications during treatment:* In more than 12,000 inflations, the symptom complex usually attributed to gas embolism occurred four times, and two cases were fatal. In 15 cases the symptom complex attributed to pleural shock was noted; none of these was fatal. Serous exudates, in amounts of 50 cc. or more, developed in 83 of 480 cases. It is believed that nearly all developed an exudate at some time during treatment, but the amount is frequently so small as to escape detection. Exudates may frequently follow the separation of adhesions. There were also 59 cases of tuberculous empyema. This usually arises from tearing a portion of the lung cortex in an effort to separate adhesions, from ulceration of a superficial caseated focus or from spontaneous pneumothorax. Aspiration should be performed early and often, supplemented by irrigation if necessary. Tube drainage should be employed only as a last resort, and, in case it is necessary, the drainage should be airtight. Sixteen instances of spontaneous pneumothorax into the pneumothorax cavity were noted. Such lung perforations are probably commoner than generally recognized, the symptoms being attributed to other causes. The perforation may be so small as to permit of only a slow leak. The symptoms are largely dependent on the size of the pneumothorax cavity, the size and character of the perforation and the presence or absence of adhesions or exudate. Sudden excessive increase in air pressure, as by coughing or physical strain, undoubtedly is a factor. In two cases rupture occurred while the patient was straining at stool. The contralateral lung was "essentially negative" in 107 cases, among which extension of disease in it occurred in four but was never a cause of failure; 282 patients already had demonstrable disease in the opposite lung, and demonstrable progression during treatment occurred in 35, being a cause of failure in 22 cases. In many cases a progression undoubtedly took place after treatment was abandoned, particularly in the "unimproved" or "fatal" group; it occurred in 10 patients who had remained clinically well for periods varying from four to six years. Obliterative changes ordinarily develop sooner or later in practically all cases, but especially in partial compressions (149 out of 245 maintained less than six months). Adhesions are the greatest obstacle to satisfactory compression. In 120 cases of this series they were apparently total, in 245 partial, and even in satisfactory compressions they were encountered in the majority. They are almost invariably present over cavities. Apical adhesions may often be stretched out into long bands, while cavities may be pressed into an elongated form. *Causes of failure:* In 187 progressively fatal cases, pneumothorax failure was attributed to the widespread character of the disease in 58, of which 42 belonged to the desolate bilateral or *ultimum refugium* group, and 7 to the acute infiltrating group.—*Treatment of Pulmonary Tuberculosis by Means of Artificial Pneumothorax, R. W. Matson, R. C. Matson and M. Bisaillon, J. Am. M. Ass., September 1, 1923, lxxxi, 713.*

Artificial Pneumothorax.—Among the earliest pioneers in artificial pneumothorax were the British, Carson, Ramadge and Cayley, while in France Hérard and Potain contributed at about the same time that

Forlanini was carrying out his studies and developing his method. *Methods:* One of the authors has had constructed a portable apparatus similar in principle to that of Forlanini, Saugman and von Muralt. When the manometric oscillations make it certain that the pleura has been entered by the needle, 200 to 300 cc. of gas are admitted and refilling continued in small quantities at frequent and gradually lessening intervals, according to the indications, always controlled by manometric readings. Periodical radioscopic examination is important, while the position and nature of adhesions can also be investigated by the screen. Compression should always be done gradually if possible. *Signs and symptoms after insufflation:* As a rule, once the lung is compressed and immobilized, patients breathe better. Usually the fever descends slowly; there may even be an immediate rise. The subsequent lowering is more rapid and marked when the pneumothorax is complete; less so when a part of the lung is adherent, when there is apt to be a temporary rise, following refills. After each of the first few insufflations the expectoration is increased, but this is followed by a distinct diminution. The complete suppression of sputum is occasionally very rapid, but usually a certain amount remains. Its character changes, and tubercle bacilli diminish and finally disappear. Hemoptyses are promptly arrested. The improvement in the general condition is often very striking, not infrequently approaching a veritable resurrection. *Complications:* Pleural effusions occur in at least 50 per cent of cases; frequently they are only recognized on X-ray examination and give no symptoms. Other cases begin with pain and fever. Reappearance after absorption is not rare. Sweating is advocated rather than aspiration. Purulent effusions may be due to tubercle bacilli alone, to mixed infection, or to septic infection, like acute empyema and pyopneumothorax. Early aspiration is not advised; later, injections of oil of gomenol may benefit the second type. In septic infections aspiration and antiseptic lavage may be tried; if unavailing, rib resection and free drainage, which must probably be followed by thoracoplasty. The outlook in such is grave. Perforation of the lung occurs in types of disease with extensive softening and severe infection, a fistula forming. The prognosis is usually fatal. Gas embolism should be avoided. Its symptoms are epileptiform seizures, hemiplegia, or sudden death. Pleural reflex may cause collapse and the treatment is that of a syncopal attack. Return of fever during treatment is usually due to pleurisy or an active process in the other lung, also sometimes to intestinal involvement. *Selection of cases:* It is a necessary procedure, when possible, in febrile cases not reacting to ordinary treatment. As a general rule, if after three months' serious treatment there are still active symptoms and fever has not ceased, it is quite useless to postpone the decision. One must make a mental picture of the evolution of the disease and spread of the lesions. One must remember that in any case of tuberculosis, if the main lesion is dealt with and rendered innocuous, smaller lesions in other parts show a tendency to cure themselves. It is even possible, and has been done in certain bilateral cases, to do a partial pneumothorax on each lung alternately. In cases of grave and severe hemoptysis, a pneumothorax is recommended first to arrest the hemoptysis; second, to prevent subsequent aspiration pneumonia. Pneumothorax may also be advantageously attempted in old chronic disease, with large cavities and much expectoration, even if otherwise quiescent, as the profuse expectoration is a distressing feature and fatal hemoptysis or bronchogenic infection is always an imminent possibility. Dense adhesions, however, frequently exist in such cases. Bilateral active lesions are a contraindication, except in the rare cases in which a double pneumothorax may be attempted. Advanced tuberculosis of other organs is a contraindication, as is also extreme emaciation, cachexia, etc., or any associated disease of grave nature. *Results:* All physicians who have had any experience with pneumothorax have had very good results, mediocre results and bad results. Some cures have been maintained for several years after the pneumothorax was discontinued, and some writers have cited as many as 30 to 40 per cent of good cases. When it is remembered that practically all of these had been bad cases proceeding rapidly downhill, it is a great satisfaction to know that there is a method which can avert the evolution of the disease. With improved methods, greater knowledge and a more precise technique, a still higher percentage of good results should be obtainable. *Pneumothorax at high altitudes:* It is generally better not to begin the induction at an altitude, as greater strain is put upon the heart and other lung. For the later treatment, however, a mountain climate is eminently suitable. An important point to remember is that the gas expands as the patient ascends, hence before travelling to a mountain resort he should be left with a low pressure. The spending of a few days at an intermediate station is recommended. Vice versa, when about to return, the patient should be given a tighter filling than usual. Nayler estimates that 2000 cc. of air at sea

level increase roughly 80 cc. per thousand feet of elevation, while 200 cc. at 5000 feet decrease by 50 cc. per thousand feet of descent.—*Notes on Artificial Pneumothorax, B. Hudson and J. Mamie, Brit. J. Tuberc., July, 1923, xvii, 108.*

Lung Splinting.—This paper covers certain points mentioned in a previous paper, abstracted under the heading, *Unilateral Immobilization of Chest in Pulmonary Tuberculosis*. Further use of the apparatus has shown that when it is worn continuously by the patient amelioration of constitutional symptoms and improvement in the local pulmonary signs and symptoms result.—*The Significance of Lung Rest in the Treatment of Pulmonary Tuberculosis, S. H. Stewart, Brit. J. Tuberc., July, 1923, xvii, 127.*

Deaths Resulting during Artificial Pneumothorax.—Generally speaking, gas embolism is the most feared complication of artificial pneumothorax, with emphysema second. Subcutaneous emphysema is less important than mediastinal emphysema, on account of the embarrassment of the heart and larger vessels occasioned by the latter. Deaths resulting directly after insufflation are not very numerous. Forlanini, up to 1912, and after 10,000 insufflations on 134 patients, saw only 12 complications of this type and no deaths. Saugman saw only one death in 104 patients given 2100 insufflations. Tidestroem in the course of 8 years, and giving 3800 refills, did not see a single death. The majority of the fatalities are attributed by Brauer to gas embolism. Begtrup-Hansen up to May, 1912, found 8 such cases reported in the literature. In 1913 Karl Sundberg reported 3 of his own cases, variously explained; but they were called gas embolism by Brauer. A year later Sillig reported a fatal case of gas embolism of the brain. The same year Hansen and Jessen each reported a case. In 1920 Link reported one case and Siebert 2 cases. Redaelli reported a case of irregular type with asphyxia. Thus, to date 17 cases have been reported. The number of fatal cases of deep emphysema are rare, only two being found in the literature. Giesemann reported one and Jessen another. To this is added the third case reported in detail in this paper. The patient had 5 needle punctures, and a valvular pneumothorax developed which was therefore difficult to locate. Aside from the purely circumscribed local gas accumulations at the needle insertion site there are 3 other forms of emphysema: (1) the subfascial emphysema (Brauer), in which the gas is between the intrathoracic fascia and costal pleura; (2) the *Schwartenemphysem*, in which the gas is confined intrapleurally (this type is difficult to differentiate from an actual pneumothorax in the roentgen picture); and (3) the last and most serious form, in which the lung itself is injured, and the gas is not limited to that introduced but may originate from the alveoli. The latter gas can extend along the interstitial lung tissue to the hilum and mediastinum or, according to Saugman and Hansen, can also reach this site subfascially. The case reported left very little doubt that the lung itself was injured and the mediastinal emphysema was pronounced. The third injection seemed to be the fatal one, since the emphysema of the neck appeared then. The fourth and fifth punctures were made to withdraw gas only.—*Ein Beitrag zur Kasuistik der Todesfälle beim künstlichen Pneumothorax, A. Sercer and R. Peičič, Beitr. z Klin. d. Tuberk., September, 1922, liii, 123.*

Lobar Pneumonia Complicating Artificial Pneumothorax.—This dual condition is extremely rare. Only a few such cases are to be found recorded in the literature, and Holden in twenty years' experience has never seen it. In the particular case reported here the pneumothorax had been induced for bronchiectasis in the right lower lobe. Four months later the patient developed a typical lobar pneumonia of the left lower lobe, shown to be a pneumococcus, type I, infection. This was treated by specific serotherapy with excellent results, complete resolution occurring. Pneumothorax treatment was suspended during the course of the acute infection, but subsequently was resumed.—*Lobar Pneumonia Complicating Induced Pneumothorax, C. T. Burnett, J. Am. M. Ass., July 21, 1923, lxxxi, 195.*

Pulmonary Perforation Complicating Artificial Pneumothorax.—With two case reports is given the clinical picture of pulmonary perforation in the course of artificial pneumothorax. In spite of the unfavorable prognosis of most similar cases the importance and value of artificial pneumothorax cannot be questioned.—*La perforation pulmonaire. Complication du pneumothorax artificiel, S. Vasiljevitch, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk-Forsch., April, 1923, xix, 468.*

Brauer on Thoracoplasty.—The decisive factors in the various thoracoplastic operations are the degree of collapse and the degree of respiratory restriction achieved. The effect of the operation depends on the extent of lung collapse, which in turn depends upon the point at which the ribs are resected

and the amount resected. The operations are thus (1) resection of the thorax for the obliteration of large, persistent empyema cavities (the thoracoplasty of Estlander, Schede and others), and (2) extrapleural thoracoplasty for treating severe unilateral pulmonary tuberculosis. Two varieties of the latter are described: (a) the Brauer-Friedrich operation, which attains the maximum collapse of the lung, but has been abandoned in its original form, in which total removal of bone was done; and its present form, a subscapular paravertebral resection, has been used for several years by Brauer. (b) A plastic operation which achieves only partial collapse and of which there are two varieties, namely, the pillar resection of Wilms which does not collapse the chest wall sufficiently in the vertical and horizontal planes, and Sauerbruch's paravertebral resection, which gets sufficient collapse in the vertical plane but not in the horizontal. All the methods require careful preparatory and after-treatment, dressing, local anesthesia, and ample drainage of large wounds. The ribs are resected as near the vertebral column as possible. In 1913 Brauer performed an incomplete thoracoplasty operation on a patient in whom the wound healed uneventfully, but the patient died 3 months later from a fatal hemorrhage from a non-collapsed cavity. At necropsy the wall of the cavity was found not rigid, and had the operation been well performed the cavity could have been completely collapsed. This case emphasizes the need for a complete radical plastic operation at the outset. On another patient, operated on in 1913, in 2 stages, in which the tenth rib was not resected and only a small part of the ninth was removed, thus preventing a complete collapse of the lower part of the lower lobe, light work only was possible for the succeeding 5 or 6 years, when the patient began to suffer from intercostal neuralgia and pain in the spine. The sputum, though profuse for 2 years, contained no tubercle bacilli. The pain was found to be due, at autopsy, to metastatic sarcoma from a primary pelvic focus. The sputum came from a marked bronchiectasis in the lower lobe, the original tuberculosis having completely healed. Whatever form of thoracoplasty is used, it is not rare to find "residual" sputum without tubercle bacilli. The same is found in artificial pneumothorax complicated by pleural effusion for a long time. In these conditions the lung is incapable of reëxpansion, as a result of fibrotic changes. By measuring the rib pieces removed, no fragments projecting beyond the line of division are left behind. The posterior line is to be as near the vertebral column as possible, especially when only little normal lung tissue is left. When the lung is not much involved, the line of division may run along the outer border of the *tuberculum costae*, the stump of the rib being allowed to project 1 to 1.5 cm. beyond the tranverse processes. The anterior line of division should run gradually upward and forward, and all the ribs lying under the scapula should be removed. A part of the chest wall is left in front and at the side, thus differing from the Friedrich operation and avoiding "fluttering." The eleventh rib may be removed at once or, if the diaphragm is insufficiently displaced upward, at a later date. Brauer does not believe it wise to remove the eleventh rib, but prefers to leave it, in order to prevent diaphragm fluttering and if it becomes necessary he removes it later. Paravertebral stumps must be removed as far as possible, so as not to interfere with movement of the scapula. The intercostal nerves should be spared. Neuralgia is to be expected when there is inflammatory edema with thickening of the pleura and periosteum. When the periosteum is thickened, and there are signs of recent inflammatory reaction in the field of operation, it is wise to resect 1 to 2 cm. of the nerves near the spine. Brauer has seen only a few cases of neuralgia and believes this can be obviated by avoiding injury to the periosteum and intercostal bridges. Scar formation around the nerves must be avoided and the periosteum of the ribs should be well scraped off, up to the transverse processes of the vertebrae. Thus the tendinous attachments of the long muscles of the back are less in continuity with the periosteum and heal with good functional results. Luer's forceps should be discarded. Division of the seventh intercostal nerve and those lower that supply the abdominal muscles may do great harm and result in paralysis of the abdominal muscles, and interfere with diaphragmatic respiration. After heart and vasomotor stimulation and clearing the chest by coughing, the patient is placed on the healthy side with a kidney pillow beneath him and the anterior part of the body slightly elevated. As little as possible of novocaine should be used for local anesthesia and great care exercised. Pain should be reduced to a minimum, but poisoning by the anesthetic is often a greater danger. Scopolamine and morphine are used to supplement the local anesthesia and avoid sputum aspiration by limiting its secretion. The arm on the affected side is drawn forward as far as possible and the incision made four finger-breadths from the midline, so that the long muscles of the back are divided where they begin to taper. Over the tenth rib the incision is carried forward to about the

midaxillary line. Friedrich's large arched incision is superfluous. The incision devised by Brauer, and described by Becker in 1914, is recommended. It is necessary to tilt up the scapula considerably, to remove the ribs under the scapula and upper thorax as radically as possible, particularly when the operator works from the paravertebral incision only. To save time, it is well to supplement this incision by an anterior incision that runs horizontally and approximately between the second and third or between the fourth and fifth ribs. The ribs are resected behind, through the paravertebral, and in front through the anterior incision; in front and behind, they are detached from their periosteum by curved raspatories and then pulled out from under the scapula. Two concave and two convex raspatories are required for the upper and lower rib margins. These incisions are useful when the operation is performed in two stages; at first a posterior, lower, and slightly curved incision is made from the eleventh to the fifth ribs, and at the second stage a short upper posterior incision in conjunction with the anterior, to remove the upper ribs. The ribs should be divided so close to the vertebrae that the scapula easily falls into the chest. The line of resection must be at least 2 to 2.5 cm. within the angle of the rib. To reach this the long muscles of the back are pulled forward by a sharp hook to the midline and their attachments to the bone are pushed back by a raspatory. The tendinous attachments of the long muscles are interfered with as little as possible. The transverse processes of the vertebrae having been brought into view, the rib is divided by a guillotine-like instrument as clearly as possible and without fragmenting it. Wrenching the vertebral stump out of its socket is to be avoided. The long muscles of the back and their tendinous attachments, as well as the trapezius, are interfered with as little as possible, and, the periosteum of the ribs with the tendinous attachments of the long muscles being merely pushed aside, these muscles become attached to the newly formed ribs or to the paravertebral stump, which projects about 0.5 cm. beyond the transverse process. The Brauer-Friderich thoracoplasty may preferably be performed in two stages, especially if the patient is too ill or the operation must be discontinued prematurely. Less radical operations should be completed at one sitting. The greatest difficulty lies in the anesthetic and the extensive division of muscles and other soft tissues. As a rule, the first to tenth ribs should be resected, beginning with the lowest ribs. When the thorax is emphysematous, or the costal cartilages are rigid, more ribs must be resected than in young subjects with elastic chests. From 10 to 12 cm. of the tenth, and 12 to 16 cm. of the ninth rib are resected. The same, or 1 to 3 cm. more, are resected from the remainder, and the anterior line of resection gradually comes around to the point, so that more is removed from the upper and front of the chest than from the lower and lateral part. It is not necessary to remove much of the lower and lateral chest wall. It is difficult to resect the first rib, which should be divided as near the vertebral column as possible. The resected portion should measure 3 to 5 cm. at its outer border and from 2 to 3 cm. at its inner border. If the apex of the lung has already retracted considerably, it may be sufficient to perform an apicolysis and leave the first rib intact. It is not, as a rule, necessary to resect the eleventh rib in Brauer's operation, but its resection may be indicated in Sauerbruch's paravertebral resection. Care should be exercised in suturing muscles and fascia, and operative speed is necessary. The patient should be encouraged to exercise as soon as possible. Carrying of a light weight on the head, first supported by the right and then by the left hand, while walking is recommended. The indications for thoracoplasty are in the main those for artificial pneumothorax; but, when attempts at the latter have failed on account of pleural adhesions, before undertaking the operation it must be shown that conservative methods have failed after fair trial, the opposite lung is sufficiently healthy to carry on the burden and the pleural surfaces are adherent. Judicious choice of material should have no more than 2 per cent mortality. The results of properly performed thoracoplasty are about the same as for pneumothorax; in 20 to 25 per cent little or no permanent improvement, in 10 to 15 per cent progressive disease in the uncollapsed lung, recovery in about 30 per cent, and in another 30 per cent considerable improvement.—*Das Ziel und die Abarten der extrapleuralen Thorakoplastik, sowie die Methodik der subskapularparavertebralen Form, L. Brauer, Beitr. z. Klin. d. Tuberk., November, 1922, li, 319.*

Brauer's Thoracoplasty.—Thoracoplasty was performed on a 28-year woman with cavernous phthisis and pleuritic adhesions on the left side. In October, 1920, the fifth to ninth ribs were resected according to Brauer. After the operation there was high fever and, after 16 days, a discharge from the cavity through the healed incision and a fall in temperature. Subsequently there was improvement, and the ulcerated area was limited to a small bone fistula at the tenth rib. At a second operation, May,

1921, the fourth to second ribs were resected with the first and the diseased tenth. After 14 days there was perfect healing. Aside from an intercostal neuralgia and an incomplete resection of the fourth rib, preventing complete sinking of the scapula, the results were satisfactory. Resection of the tenth rib is not entirely necessary to attain a satisfactory collapse.—*Röntgenogramm einer Thorakoplastik nach der Methode von Brauer, F. Oehler, Beitr. z. Klin. d. Tuberk., November, 1922, li, 380.*

Extrapleural Thoracoplasty.—In the cases of extrapleural thoracoplasty performed by Schreiber of Davos from 1913 to 1920, the Sauerbruch paravertebral method was used with slight modification, in that the ribs were almost completely resected. As complete as possible removal of all sputum before and after the operation is urged. Pneumolysis of the apex is also important as a preliminary measure. In 40 cases artificial pneumothorax had existed for some time. The statistics favor a two-stage operation, for thus the mortality proved to be less. Scoliosis followed the operations. Operation should not be done as a last resort, since it is just these cases that result unfavorably. Nephritis, amyloid, and intestinal tuberculosis, but not laryngeal or unilateral kidney tuberculosis, are contraindications. Of the total of 100 cases operated upon, the mortality was 24 per cent, the improved 16 per cent and the healed 37 per cent. Among the bad-prognosis cases the operative mortality was high; in the favorable cases the reverse was true. The causes of death were, in order of frequency, cardiac death, aspiration pneumonia, wound infection, hemoptysis, embolism, nephritis and fatal medicinal intoxication. As a whole, the thoracoplasty is a decided advance, with results more certain than with artificial pneumothorax.—*Beitrag zur Behandlung der Lungen-Tuberkulose mit extrapleuraler Thorakoplastik, H. Stöcklin, Beitr. z. Klin. d. Tuberk., November, 1922, li, 350.*

Pneumonectomy with Cautery.—Chronic lung suppuration is a most difficult condition to treat satisfactorily. In many cases the lung appears to be honeycombed with pus. Usually the bronchi are dilated and their walls thickened, their lumina containing granulation tissue which bleeds easily. Fibrosis is common. The various methods of artificial compression usually fail to give relief. Theoretically, the only satisfactory procedure is removal of the diseased tissue. Lobectomy, however, is a formidable procedure. Of 48 cases collected, there was an operative mortality of 52 per cent, and complete success in only 17 per cent. The principal danger is dissemination of infection, as mobilization of the lung preparatory to removal exposes a large raw surface of the pleura and usually also of the pericardium. The operation here described amounts really to lobectomy performed by the actual cautery. Only the first stage, exposing the lung field, requires anesthesia. With a large soldering iron, heated to a red heat, an excavation is then made into the lung tissue, beginning usually with the sinus tract if there has been a drainage operation. The operation is continued until all the diseased tissue has been removed by the cautery. A large cavity is left, lined by an eschar which sloughs away in about ten days. The most remarkable feature of the operation, which was performed in three cases, was the absence of any severe postoperative reaction. The cavity and bronchial fistulas gradually become obliterated. Expectoration ceases and the general condition begins to improve. As an important aid, heliotherapy, as advocated by Rollier, was employed. All three patients did well, although one, whose wound broke open again, was lost sight of. When one considers the previous very serious, almost hopeless, condition of these patients, it seems justifiable to extend the scope of this comparatively simple operation. There would doubtless be some mortalities in a larger series, but the risk is quite evidently much less frightful than that of lobectomy by the ordinary method.—*Pneumectomy with the Cautery, E. A. Graham, J. Am. M. Ass., September 22, 1923, lxxxi, 1010.*

Induced Abortion in Pulmonary and Laryngeal Tuberculosis.—In laryngeal tuberculosis pregnancy should be interrupted as early as possible and sterilization done at the same time. If a woman with laryngeal tuberculosis comes for treatment only toward the end of pregnancy, treatment is expectant, with careful consideration of every operative procedure, on the one hand, and, on the other, the possibility of a spontaneous birth. In manifest pulmonary tuberculosis of Stage I (Turban-Gerhardt) simple interruption of pregnancy in the early months is indicated, with precautionary measures to avoid repetition of the pregnancy. If a stage I case becomes pregnant and the process shows renewed progression or, if dealing with a stage II case, early interruption and sterilization are recommended. A stage III case can be sterilized at the time of interruption or later; but it must be clear that in the most favorable cases improvement may or may not be appreciable. Lumbar anesthesia is recommended, with abdominal supravaginal amputation of the uterus,

leaving at least one ovary behind. Latent pulmonary tuberculosis cases which become gravid should have a lung examination every fourteen days, so that with the slightest flaring-up of the process the pregnancy can be interrupted. The life expectancy of children of tuberculous mothers is poor. Children from mothers suffering from laryngeal tuberculosis, who died during the first few days after birth of the child, revealed negative Pirquet tests and were well developed physically. The demand that children from tuberculous mothers be removed from their surroundings is justified from a hygienic standpoint.—*Über die Spätwirkung des künstlichen Abortes sowie der Sterilisation auf die Lungen und Kehlkopftuberkulose, P. Schumacher, Arch. Gyn., March, 1922, cxvi, 391.*

Heliotherapy with Tuberculin in Surgical Tuberculosis.—Combined tuberculin (Rosenbach) and sun treatment was used on 61 cases of surgical tuberculosis. The results were mainly negative, and in a large number harm was done. In a few difficult cases, however, good results were obtained. Careful selection of cases will diminish the harmful effects. The indications and contraindications for the use of tuberculin (Rosenbach) and sun treatment are discussed.—*Unsere Tuberkulin-Erfahrungen bei planmässig sonnenbehandelter chirurgischer Tuberkulose, W. Graf, Deutsche Ztschr. f. Chir., May, 1922, clxxi, 57.*

Tuberculin Treatment and Heliotherapy in Orthopedic Tuberculosis.—Clinical reports as to the value of tuberculin vary, but the three cases reported here improved. Treatment began with doses of 0.0002 mgm. of bouillon filtrate which in the course of about three months was increased to a maximum dose of 0.01 mgm. Doses were administered at first once and later twice a week. Frequently temperature elevations of 100° to 101°F., and occasionally higher, occurred, but without definite constitutional reactions. The temperature was lower and more regular after the course of treatment. Two cases of tuberculosis of the hip and two of tuberculosis of the spine were exposed to sunlight after the procedure of Rollier and were improved.—*Treatment of Bone and Joint Tuberculosis with Tuberculin and Heliotherapy, J. Bone & Joint Surg., October, 1923, v, 721.*

X-Ray Dangers in Tuberculosis.—Two fatal cases are reported in which large roentgen ray doses in the treatment of surgical tuberculosis of children resulted disastrously. In one there was tuberculosis of the hand and forearm in which, 14 days after treatment, meningitis developed. The child was 18 months old, and the treatment was applied on the back of the hand and over the left ulna, the rays being filtered through 3 mm. of aluminum, so that only 40 per cent H. E. D. was utilized. The second case was a 9-year-old child with peritoneal tuberculosis, in which the rays were applied to the back and abdomen with a 33 cm. focus, through 4 mm. of aluminum for 30 minutes, this being repeated 4 weeks later; 12 days after the second raying symptoms of miliary tuberculosis developed. It is believed that the large doses were responsible for the dissemination of the infection. The doses have been reduced one-half since then, with better and more rapid results.—*Bestrahlungsschädigung bei Tuberkulose, W. Vollhardt, Centralbl. f. Chir., October, 1922, xlviii, 1586.*

Sarcoma Due to X-Ray Therapy of Bone Tuberculosis.—Two cases of tuberculosis and sarcoma combined are reported. In both cases (12 and 17 years of age) there was a joint and bone tuberculosis (knee), which had been treated with X-rays and was healing. After 5 and 7 years there developed an osteosarcoma and an enchondroma. Sarcoma can occur in association with tuberculosis but this is not very likely. It is more likely that the tuberculosis produced a *locus minoris resistentiae*, which was the etiological factor, and the intense raying caused the neoplasm. It is urged that further observations be made on this point.—*Tuberkulose und Sarkom (Röntgensarkom?), E. Marsch, Centralbl. f. Chir., July, 1922, xlix, 1057.*

Tuberculin Treatment.—Especially good results were obtained in the tuberculin treatment of serous pleural and peritoneal effusions. Immediately after the beginning of injections fever diminishes, to disappear after one to three injections, with the occurrence of diuresis. The diuresis is also of prognostic value, since cases with oliguria, instead of polyuria, are unfavorable. In phthisis cases judgment is not so easy. Prognosis is difficult in apical catarrh, since under this head are included various types of cases prognostically. The tuberculin action is not attributed to immune processes, but rather to its power to cause hyperemia around the focus and to stimulate the activity of the lymphatic organs. This view favors the use of doses which occasion a lymphatic and focal reaction but not too severe a focal reaction. The matter of the tuberculin preparation used is unimportant; only quantitative, not qualitative, differences exist between the different preparations.

Partigen treatment is not favored, since it achieves no more than other tuberculins. The system of dosage used is described, being based on volume and not weight. All cases, as is often done, should not be started on the smallest doses, but, rather, it should be aimed to reach the optimal dose as soon as possible. By minimal doses the process can be unfavorably influenced (resorption of pleural exudates can be retarded, anaphylactic reactions according to v. Hayek can occur, and fever can increase). For the purpose of tuberculin dosage, tuberculosis is divided into open and closed, and further into afebrile, subfebrile and high febrile cases. The afebrile and subfebrile closed cases are further subdivided into hospital and ambulant forms.—*Die spezifische Therapie und Diagnostik der Tuberkulose, W. Neumann, Wien. med. Wchnschr., March and April, 1922, lxxii, 476, 526, 568 and 602.*

Tuberculin Treatment.—Tuberculin treatment is considered as stimulating and actively immunizing. It is recommended not to use tuberculin in graduated increasing doses but to utilize the symptoms of the patient as a guide to its application.—*On Tuberculin Treatment, Morisuke Ohtani, Tokyo Iji-shinshi, January, 1923, no.2311, Abstr. from Japan Medical World, May, 1923, iii, 108.*

New Treatment for Tuberculosis.—It is believed that the tubercle bacillus toxin has a special affinity for benzoic and salicylic acids and that the lipoidal constituents of the bacillus contain a substance having an astringent action upon the tuberculous focus. The powdered bacilli are treated with cholate of benzol and ether, and the crystals thus obtained are further treated with salicylic or benzoic acids. This material was found to have a marked astringent action on tuberculous foci. It is further suggested that similar extracts may be obtained by using various kinds of vegetable and animal lipoids, such as codliver oil, chaulmoogra oil, etc.—*On My Treatment Method of Tuberculosis, Shigemitsu Tanaka, Kekkaku Zassi, November, 1922, v, no. 5., Abstr. from Japan Medical World, March, 1922, iii, 54.*

Dreyer's Tuberculin.—The arrival of a new tuberculin, Dreyer's antigen, again brings into prominence the important subject of dosage and administration of these substances, powerful for harm as well as good, and necessarily given at the start in doses almost immeasurably small. A simple method of serial dilution is described in which each dilution represents one-tenth the strength of the one above. The diluting solution recommended is 0.15 per cent formalin in sterile normal salt solution. The dose is usually started in fluid measure. If it is demanded, for Dreyer's antigen, that a dose be stated in milligrams of solid substance, this is easily arrived at by dividing the dose in cubic centimetres by 5 (since 1 cc. contains 0.2 mgm. of antigen). In the matter of initial dosage it has been found that Dreyer's antigen is weaker than any of the tuberculins in common use. For convenience it may be considered to be one-tenth the strength of T. R., the weaker of the older tuberculins; hence a safe initial dose would be 0.00001 cc. Dosage should be increased in geometrical and not in arithmetical progression, and the reasons for this are given. A useful table of dosage is included which offers a consistant increase which can be modified to suit the individual case. It seems likely that "local reactions" will be less common with Dreyer's antigen, and hence we must be all the more watchful for slight effects on temperature (both up and down) and on general symptoms, as indications that the "threshold of response" is reached, and a more sloping gradient of dosage indicated.—*Diaplyte Tuberculin, C. Riviere, Lancet, August 18, 1923, ccv, 324.*

Treatment of Tuberculosis by Spahlinger's Method.—Spahlinger's treatment is of two kinds; namely, serums for acute and severe cases, and vaccines for early and chronic pulmonary cases and for all surgical cases. The serum acts rapidly, symptoms diminishing and often disappearing within the first few months. If the serum is stopped before a complete recovery has been established signs of activity are liable to recur. This is because serums are capable of conferring a passive immunity only. It is the vaccines which evoke the active immunity; these act less rapidly than the serums. Improvement under the former does not become evident until the body has had time fully to mobilize its defensive mechanism. Twenty-three cases of tuberculosis which received the Spahlinger treatment are reported in some detail without comment. Most of them are pulmonary cases and there is a history of positive sputum in 18. In all but three cases the outcome has been favorable, usually remarkably so.—*Treatment of Tuberculosis by the Spahlinger Method, L. Williams, Brit. M. J., September 22, 1923, no. 3273, 519.*

Petruschky's Percutaneous Treatment.—Various types of percutaneous treatment of guinea pigs did not have the slightest effect on the course of their tuberculosis. It is suggested that these results

may encourage a critical experimental study in human beings.—*Die experimentellen Grundlagen moderner Tuberkulosetherapie. II. Die Percutanbehandlung nach Petruschky, Bürgers and Webering, Beitr. z. Klin. d. Tuberk., September, 1922, liii, 75.*

Skin Inunctions with Ectebin.—People with skin tuberculosis show a tendency to healing of internal tuberculosis, especially of the lungs. This effect is attributed to changes produced by the skin tuberculosis which exert a favorable influence upon the pulmonary lesions; detoxicated reaction-bodies can be demonstrated in the cells of toxic skin tuberculides. An attempt was made to imitate this action. The simplest method is by tuberculin inunctions. The skin nodules are highly specific and resemble tuberculo-toxic skin lesions. At first the diagnostic tuberculin ointment of Merck was used. This proved inadequate, since only the soluble bacillary proteins were thus used while those producing the partial-antigen neutralizing substances were lacking. To get the desired effect a concentrated tuberculin ointment, containing killed human and bovine bacilli, was used and called *Ectebin*. The ointment is rubbed into the chest, back or abdomen, one minute, alternately, at 1 to 4-week intervals, for a total of 6 administrations; after each inunction the reaction must have completely subsided before the next is given. This method has been used in children with good results, except in the third stage, in which cases it was not attempted. Prophylactically, the method proved of no value.—*Spezifische Tuberkulosebehandlung mit Einreibungen von Ektebin in die Haut, E. Moro, Beitr. z. Klin. d. Tuberk., September, 1922, liii, 156.*

Tebelon in Treatment of Tuberculosis.—The underestimation of animal tests is deplored, even though it is admitted that all disputed questions cannot thus be definitely settled. Too often are tests made on human subjects directly. During the past years a number of substances have been tested in animals. This contribution concerns itself with *Tebelon*, the isobutyl ester of oleic acid used by Stöltzner because it was easily resorbed and was soluble in wax. The absorption, formation of wax-antibodies or ferments and therapeutic activity were tested. In the guinea pig, in distinction to the rabbit, there occurred a rapid absorption of the *Tebelon*. Complement-binding substances were not found in the serum of normal or tuberculous guinea pigs treated with tebelon, nor in children. The intracutaneous reaction with tebelon was not different in treated and control rabbits. Ferment formation also was lacking. The course of tuberculosis in guinea pigs infected with slightly virulent bacilli, and treated with varying doses and at different intervals, was uninfluenced. Likewise, no effect was noted on intercurrent septic infections in guinea pigs.—*Die experimentellen Grundlagen moderner Tuberkulosetherapie, T. J. Bürgers, Beitr. z. Klin. d. Tuberk., September, 1922, lii, 69.*

New Remedies for Tuberculosis.—Improvement resulted from the use of *Moriamin* and *Moritein* in 76 per cent of 105 cases of pulmonary tuberculosis treated.—*On Moriamin and Moritein, New Remedies of Tuberculosis, Seiko Nomura, Kekkaku Zassi, October, 1922, v, no. 4, Abstr. from Japan Medical World, March, 1923, iii, 54.*

Treatment of Pulmonary Tuberculosis with Tincture of Iodine.—The treatment of pulmonary tuberculosis with tincture of iodine gives good results, provided treatment is begun with 10 to 51 drops and a final dosage of 250 to 300 drops is reached. These conclusions are arrived at after the treatment of 7 cases. Only in chronic and torpid forms should results be expected. The author does not agree with Boudreau who views the tincture of iodine as a direct specific and a heroic method for tuberculosis.—*Contribution à l'étude du traitement de la tuberculose pulmonaire par la teinture d'iode, L. Viguié, Dissertation, Montpellier, 1922, Abstr. from Centralbl. f. d. ges. Tuberk.-Forsch., April, 1923, xix, 466.*

Silica Therapy in Pulmonary Tuberculosis.—The value of silica in tuberculosis has been established, but results are uncertain when silica preparations are administered by mouth because of variation in conditions of absorption. Kühn recommends intravenous administration of sodium silicate, which he has already found useful in arteriosclerosis, asthma and other diseases. Considering the favorable effect of iodine in tuberculosis as thoroughly established, he advises combining this substance with the silicate. The iodine has a further favorable effect in that it reduces the alkalinity of the sodium silicate. A preparation can be made by combining iodine and sodium silicate, the alkalinity of which is to that of 1 per cent sodium silicate as 10 to 62. Kühn has injected the combination in 5 cc. amounts, and while his experience with tuberculosis is not yet extensive, he feels warranted in believing that the preparation in uniformly without ill effect. No temperature change or other general reaction has been observed following its use. Special

precaution is of course indicated in thyroid disease.—*Zur Kieselsäuretherapie der Lungentuberkulose, A. Kühn, München. med. Wchnschr., July 20, 1923, 937.*

Silicic Acid in Treatment of Pulmonary Tuberculosis.—Silicic acid therapy, in 14 cases of open pulmonary tuberculosis, had no effect on the temperature or the amount, character or bacillary content of the sputum. Silicic acid is a poor form for body administration. Its prolonged use, necessary for months and years, is also against its practicability.—*Über das Silicium, speziell die Kieselsäure bei der Therapie der Lungentuberkulose, E. Kadisch, Beitr. z. Klin. d. Tuberk., September, 1922, liii, 111.*

Guaiacol-Iodoform in Pulmonary Tuberculosis.—The intravenous injection of guaiacol-iodoform is recommended. The method has been used on 572 cases with good results. This agent is supposed to act in an "antibacterial" or "bactericidal" manner.—*Neues chemotherapeutisches Heilverfahren bei Lungentuberkulose, W. Müller, Wien. med. Wchnschr., January, 1923, lxxiii, 157.*

Treatment of Tuberculosis with Tonophosphan.—This preparation, which produces marked benefit in various debilitated states, proved of no more help in tuberculosis than the ordinary sanatorium treatment, although 6 out of 10 cases lost their malaise and gained weight during the course of ten injections.—*Ueber Tonophosphan bei der Behandlung der Lungentuberkulose, Deutsche med. Wchnschr., August 10, 1923, xlix, 1058.*

Combined Krysolgan and X-Ray Treatment of Experimental Tuberculosis.—The effect of Krysolgan injections, and X-rays combined with Krysolgan, on rabbits infected with human tubercle bacilli was studied. All the animals had a predominantly productive tertiary pulmonary tuberculosis, without involvement of the hilum lymph nodes. Two series were given 1 to 10 mgm. of Krysolgan, intravenously, begun on the tenth to thirtieth day after infection, and another series 5 to 20 mgm. Focal reactions were not discernible. Combined roentgen-raying and Krysolgan also gave no convincing results.—*Untersuchungen über die Beeinflüssung experimentell erzeugter chronischer Lungentuberkulose des Kaninchens mittels des Goldpräparates "Krysolgan" und durch Röntgenbestrahlungen, I. Mittl., H. Gorke and G. Töppich, Beitr. z. Klin. d. Tuberk., September, 1922, liii, 132.*

Painless Maxillary Sinusitis Simulating Pulmonary Tuberculosis.—A number of cases of sinusitis without localizing symptoms are diagnosed as pulmonary tuberculosis. These generally present not only the symptoms of tuberculosis, namely, cough, often waking the patient at night; morning sputum, yellow or green in color, and often nummular; progressive wasting; a rise in temperature in the evening and after exercise; but also certain physical signs in the chest due apparently to bronchitis, which, while not typical of tuberculosis, are sufficient to render extremely difficult the exclusion of this in the diagnosis. The absence of tubercle bacilli from the sputum does not exclude tuberculosis. In the literature a number of references are cited showing the connection between sinus infection and such conditions as bronchitis, bronchiectasis and bronchorrhea. In infection of the nasal passages, if there is an accumulation of mucus and pus in the antrum due to some obstruction at the opening of the antrum into the middle meatus, empyema of the antrum results. If, however, the obstruction is slight, empyema does not supervene; the cilia pass the mucus and pus into the middle meatus, and backwards until it reaches the nasopharynx, from which it is passed along the posterior wall of the oropharynx to the pouch between the epiglottis and the tongue and to the posterior part of the larynx. Here it comes to rest in the space between the arytenoids and upon the posterior surface of the arytenoids. The mucous membrane in front of the antrum opening appears normal. That behind the opening and that of the pharynx shows marked reactive changes due to the passage of mucus and pus over it. It is this pus or mucus, passing down the pharynx, that collects in the laryngopharynx and is expelled by coughing in the morning. The delay in removing the infected mucus allows toxic absorption, and, as a result, in some cases wasting, evening elevation of temperature, and night sweats are observed. Such a condition may simulate or complicate pulmonary tuberculosis. *Diagnosis: 1. Pulmonary tuberculosis:* The thinness, pallor and lack of reflex sensibility of the mucous membrane, larynx, pharynx, and soft palate are so rarely absent in the earlier stages of pulmonary tuberculosis that they should be considered with the remainder of the facts in establishing a diagnosis of this complaint. *2. Sinusitis:* In painless sinusitis, with only slight obstruction, the diagnosis rests primarily on the presence of pus which can be seen dropping from behind the soft palate. The pharynx, larynx and nares show hyperemic and hypertrophic changes.

The treatment of sinusitis without tuberculosis follows the usual lines. Sinusitis complicating tuberculosis may at times be responsible for a flare-up of the tuberculous process. The sinuses should be packed with some antiseptic of prolonged action, such as iodoform emulsion. A local anesthetic should be used when operation is indicated. As to prognosis, in a series of 100 cases of tuberculosis with sinusitis no conclusion can be drawn as to the effect on the activity of the tuberculosis.—*The Simulation of Active Pulmonary Tuberculosis by Painless Maxillary Sinusitis, A. L. Yates, Lancet, November 3, 1923, ccv, 968.*

Acute Pulmonary Affections.—*Pneumonia:* "When in doubt, consider "pneumonia." Since the influenza wave of 1918 the atypical form has become the rule rather than the exception. As to treatment, a good nurse, endowed with cheerfulness and common sense comes first; after this, a sunny, airy room, with an open fire; fresh, but not cold air; digitalis before there is evident heart failure, and morphia in small doses, to promote rest and tranquillity. There are perhaps 20 per cent of pneumonia patients, as Shattuck has estimated, whose ultimate outcome is affected by treatment. *Acute tracheitis and bronchitis:* These are usually secondary to infection higher up. The disease is usually self limited, except in infants and elderly persons. Of first importance in treatment is rest in bed; second, the drinking of large amounts of water; third, catharsis; fourth, making the patient as comfortable as possible. Mild sedatives, as bromides, veronal and aspirin, reduce coughing and relieve aches and pains, and are preferable to heroin or codein. Oil sprays and steam inhalations with benzoin, are often soothing. As an expectorant, syrup of hydriodic acid is efficacious. *Pleurisy:* Since the influenza epidemic we are less likely to look upon pleurisies with insidious onset as tuberculous, but tuberculosis should be borne in mind. A tight bandage or adhesive strapping best relieves the pain. Do not tap too hastily nor postpone tapping too long. Make use of the fluoroscope or X-ray. Keep all such patients under observation for some months. *Pulmonary infarction:* The onset is sudden, often following operation, and the symptoms severe, with shock and pain in the chest. An area or areas of consolidation are apt to appear, and blood-spitting is a characteristic symptom. The treatment is expectant, and the outlook serious. *Pneumothorax:* With the exception of infarct, no acute chest condition is more terrifying. The background is usually tuberculosis, though it is not always demonstrable. Pneumothorax may occur in lobar pneumonia. These patients should be kept under careful, prolonged observation. *Influenza:* When the symptoms are severe, it may be taken for granted that there is a patch of bronchopneumonia. Postinfluenzal depression and bronchitis are very definite clinical entities. A period of rest and relaxation, if possible in a pleasant climate, is very valuable. These acute infections do not bear well cold air treatment. *Abscess:* With the help of the X-ray, diagnoses can be made much earlier than formerly. The appearance of cough and fever after any nose and throat operation is suspicious. Many abscesses recover spontaneously; others require prompt surgical treatment. In any case consultation with an expert chest surgeon is recommended. *Acute secondary pulmonary infections:* There is usually a history of a bad cold which failed to clear up. Râles of all kinds are common. An acute or subacute pneumonitis or pleuritis is probably the underlying condition. The best treatment is a radical change of climate and surroundings. Syrup of hydriodic acid and large amounts of water will help, as will also postural drainage. Bromides are used to check the cough. *Pulmonary hemorrhage, tuberculous:* To reassure the patient and family is most important, as few people except in the advanced and active stages, die of hemorrhage. There is a mechanical hemorrhage, occurring in chronic, inactive tuberculosis, when unusual exertion is attempted, and the type occurring in active, progressive disease, and more serious. Atropine, in large doses up to $\frac{1}{50}$ of a grain, is the only drug recommended. In no emergency is the personality of the physician more important. A position partly upright, or reclining, is preferred to the prone one. Rest in bed is essential. Pneumothorax, admittedly valuable, is rarely available. *Asthma:* An acute attack may be very terrifying. It usually responds promptly to the subcutaneous injection of adrenalin chloride. Morphia is occasionally indicated, but not often. In the cardiac type, rest, morphia and digitalis are of greatest value.—*The Acute Chest, J. B. Hawes, 2nd, Boston M. & S. J., July 12, 1923, clxxxix, 50.*

Roentgenographic Appearance of Lobar Pneumonia.—In two years at the St. Louis City Hospital, 152 cases of lobar pneumonia were subjected to roentgenographic examination. It was found that, owing to the similarity in appearance, differentiation between the stages of active consolidation is impossible by the roentgenogram. In the majority of cases, lobar pneumonia starts as a consolidation in the hilum region,

although in a few cases in children, the onset of consolidation is cortical and progresses toward the hilum. During the early stage, the consolidation may be confined about the hilum and resemble hilum pneumonia. Within twenty-four hours, however, the hilum consolidation should spread toward the periphery. Regardless of the rate of progress the shadow produced is of homogeneous character showing only dense peribronchial markings, which, at the onset, are usually seen through the consolidation shadow. The zone of advance of the process is leathery and uneven, and shades off into the normal tissue. The edge of the advancing shadow is composed of the radiating extension of accentuated peribronchial markings. As the disease progresses, the peribronchial markings become obliterated and the entire shadow may be of homogeneous density. In the natural course of the disease, little change is seen in the shadow from the time complete consolidation is reached until the time of the crisis. Shortly after the crisis, resolution begins, and the shadow changes rapidly from the homogeneous type to that of an uneven mottled appearance. Very soon the accentuated peribronchial markings again become apparent, and the uneven mottled area gives place to groups of soft isolated infiltrations. The entire area may be overshadowed by a pleural haze if the pleura has become thickened during the course of the disease. Resolution is rapid and all evidence of infiltration and consolidation may have completely disappeared within three days after the crisis. Ordinarily, however, complete resolution requires a somewhat longer time—from seven to ten days; persistence of consolidation for fourteen days after the crisis should be viewed as distinctly pathological and as suggesting a complication. The characteristics of consolidations confined to various lobes are discussed and the literature is commented on. The five most common complications of lobar pneumonia are taken up in the following order, paying particular attention to the roentgenographic shadows: (1) any pleurisy with thickening of pleura; (2) pleural effusions, serous or purulent, either generalized or localized; (3) plastic serofibrinous pleurisy; (4) chronic interstitial pneumonia or fibrosis; and (5) lung abscess. Among other conditions considered under differential diagnosis, tuberculosis is mentioned. Caseous tuberculous pneumonia, for instance, may be confused in the roentgenogram with acute lobar pneumonia. The clinical history is important and while caseous pneumonia requires from three to four months for resolution, lobar pneumonia may resolve in as many days. The former usually leaves behind definite cavity formation; the latter resolves completely and leaves a normal appearance. Caseous pneumonia may involve any lobe, but usually it affects an upper lobe, more frequently the right. In the resolving stage of lobar pneumonia, the most easily confused lesion is that of the infiltrative type of tuberculosis, especially when the pneumonia involves an upper lobe. Here again the clinical history may be the determining factor; a short duration and profound illness suggest an inflammatory process; a longer duration without serious illness labels the condition as more probably of tuberculous origin.—*A Study of Lobar Pneumonia and Its Pulmonary Complications by Serial Roentgenographic Examination, L. R. Sante, Amer. J. Roentgenol. and Rad. Therap., May, 1923, x, 351.*

Organizing Pneumonia.—This condition is not commonly encountered at necropsy and is almost never recognized in the living patient. It is of clinical importance because it provides an anatomic basis for the otherwise vague state known as "unresolved" pneumonia, and for at least some of those cases of pulmonary fibrosis which do not appear to be tuberculous and which are now frequently ascribed to syphilis in spite of the fact that syphilis of the lungs is rare. In the latter part of last winter, at Bellevue Hospital, the condition became distinctly more frequent than it had been in previous years, the incidence among pneumonia cases autopsied having risen from 3.2 to 20.6 per cent. The incidence of unresolved pneumonia, as encountered clinically and of organizing pneumonia as met at necropsy, is ordinarily practically identical. Furthermore, in view of the fact that the clinical signs of unresolved pneumonia are not to be distinguished from those of organizing pneumonia, the assumption appears justified that they represent one and the same process. The symptomatology of organizing pneumonia is that of lobar pneumonia with delayed resolution. Anatomically, the process may involve one or more lobes diffusely. As a rule, however, the distribution is patchy, the individual patches varying in size from one to several centimetres. The earliest stages are marked by congestion of the lung; the cut surface is of velvety smoothness, and scattered over it are numerous minute whitish or grayish white specks. The involved area is somewhat leathery or rubbery in consistence. At this stage histological examination shows congestion of blood vessels; in the alveoli are plugs of smooth, pinkish staining material, representing hyalinized fibrin. In some instances the fibrinous plugs extend from one

alveolus into the next, thus assuming an hour-glass shape. Still other alveoli are consolidated by polymorphonuclear leucocytes, fibrin being absent, and the lumina of the smaller bronchioles are similarly occupied. The second stage is characterized by diffuse or patchy grayish or grayish-red, firm consolidation. Histological examination shows variable numbers of fibroblasts growing into and replacing the fibrinous plugs in the alveoli, the fibroblasts being arranged in parallel formation or in semilunar fashion. The third stage is marked by replacement of the fibrinous plugs by rounded or oval collections of fibrillar connective tissue. In occasional cases, the lung presents solitary or multiple cavities filled with pus. The pleura may be free or greatly thickened. The condition is anatomically and histologically distinct from the ordinary chronic interstitial pneumonia of syphilis, tuberculosis and the like, since the connective tissue replacement is almost exclusively confined to the intraälveolar spaces. The condition does not seem to be an independent clinical entity, but is to be expected in a certain proportion of all cases of lobar pneumonia; its existence should be suspected whenever the physical signs of consolidation persist beyond the usual time. —*The Increased Incidence of Organizing Pneumonia, D. Symmers and A. M. Hoffman, J. Am. M. Ass., July 28, 1923, lxxxi, 297.*

Chronic Bronchitis.—Cabot has doubted the existence of chronic bronchitis because in twenty years at the Massachusetts General Hospital he has never seen such a case come to autopsy. While it is true that this term is often misapplied to cases of weak heart, bronchiectasis and interstitial pneumonitis, it is nevertheless reasonable to suppose that there may be a subacute and chronic bronchitis, just as there is an acute bronchitis and an acute and subacute rhinitis. Osler regards it as a definite entity, and Babcock considers many cardiac lesions secondary to it rather than vice versa. Landis and Norris consider it rare, and the former recognizes as a primary disease only the type due to inhalation of inorganic dust. "Cotton fever" is probably a type due to organic dust. Hawes uses the following clinical classification: *1. Primary chronic bronchitis: a.* due to irritant dust, as cotton, flour, etc.; *b.* gouty bronchitis, occurring in elderly plethoric hypersensitive people. *2. Secondary chronic bronchitis: a.* secondary to upper respiratory tract infections; *b.* following an acute pulmonary infection, as influenza or bronchopneumonia; *c.* the type following gassing in ex-service men. *Prominent signs and symptoms are:* cough, usually worse in winter and damp weather; sputum, usually mocopurulent; constitutional symptoms, usually not marked, sometimes of a neurotic sort; signs in the lungs usually diffuse and variable. Patients with gouty bronchitis are apt to be overweight, present dry basal squeaky and wheezy râles, and X-ray examination often shows, along with a somewhat enlarged heart, the changes called "peribronchial thickening." Treatment of this type consists in depletion and elimination. Diet should be cut down at least one-third, particularly meat, and the water intake increased. Iodide of potash is beneficial in gradually diminishing dosage. Exercise is important, but cold night air should be avoided. Bronchitis due to upper respiratory tract infection may closely simulate tuberculosis. The source of infection should be removed. Chronic bronchitis following acute pulmonary infections occurs in patients in poor physical condition. They need encouragement, iron, rest and a change. Chronic bronchitis following gassing may be due to an interstitial pneumonitis and occasionally a bronchiectasis. Often there is considerable peribronchial thickening, especially toward the bases. Most of these patients have at one time or another been labelled tuberculous suspects and are nervous and apprehensive. Some need a frank, encouraging talk, others severe and even brutal admonition and to be put to work. They are often helped by iodide of potash; occasionally with belladonna if expectoration is profuse. Wind and dust and cold night air are harmful. The cough habit sometimes must be broken up. Asthmatic bronchitis is rather a form of asthenia than of bronchitis. Vaccines are rarely of use and are to be regarded as rather a last resort measure.—*Chronic Bronchitis, J. B. Hawes, 2nd, Boston M. & S. J., August 2, 1923, clxxxix, 166.*

Occupational Prevalence of Bronchitis.—Bronchitis is the most important of all diseases when morbidity and mortality are taken together, according to English and Welsh records. Yet it is a preventable disease. It produces two-elevenths of all sickness in these two countries, and amounted to 68,000 years of sickness during 1922 among insured persons and probably to 80,000 when all bronchitis is taken into consideration. Its prevalence fluctuates, being highest in the winter months. The mortality rate is somewhat higher in men than in women, has declined steadily since 1880 and is very much greater after age thirty-five than prior to that age; it is especially high in late life. Mortality from bronchitis was

very low in 1922–1923 when there was a very mild winter; it was low in Scotland in 1921, "the year of the coal strike." Industrial environment and occupation do not exert as profound an influence on bronchitis mortality in males and females as upon the mortality from pneumonia or that from phthisis, but such environment and occupation produce marked influence upon the total mortality from bronchitis, that is, there is a much higher mortality rate from this disease among urban than among rural dwellers. In the various occupations the disease fluctuates independently of pneumonia or phthisis, and, in general, the aggregation of persons in industry does not influence the spread of the disease as it does in phthisis. Exposure to smoke and to inorganic or vegetable dusts is productive of much bronchitis, and this is a forerunner of the pneumonokonioses. "Reduction in morbidity and mortality from bronchitis is to be sought for in two directions: (1) in social uplift, that is, by such increase of health . . . . as establishes resistance to disease; and (2) in smoke abatement."—*The General and Occupational Prevalence of Bronchitis, and Its Relation to Other Respiratory Diseases, E. L. Collis, J. Industr. Hyg., November, 1923, v, 264.*

Treatment of Bronchial Fistula.—These were encountered in a large series of chronic empyema cases, varying in duration from two to seven years and all demonstrated by direct observation. Many of the patients had undergone various forms of radical operation, but the empyema and fistulas persisted. Of the 35 cases, 84.2 per cent were due to intrapulmonary suppuration, and 31.5 per cent had tuberculosis as an underlying factor. Closure was effected in 37 per cent by simple mobilization and sterilization; in 50 per cent by mobilization and partial suture, with muscle implantation; in 10.5 per cent by mobilization and muscle implantation; and in 2.6 per cent by inversion. Small multiple fistulas were closed by cauterization. There is only a small percentage of bronchial fistulas that can be inverted satisfactorily, and such procedure is not indicated in the majority. The most difficult problem has been the treatment of multiple fistulas in tuberculosis cases. Here an attempt is made to close the lesser fistulas first by cauterization, mobilization, pursestring suture and muscle grafting. The largest fistula is left open until all the lesser ones are occluded, and then closed by partial suture and muscle implant. Another method used is a pedunculated muscle flap covered with skin, the wound being left wide open and dressed with 20 per cent argyrol, with later application of gentian violet to promote healing if air escapes. When surgical solution of chlorinated soda (Dakin) is not tolerated for sterilization, a 20 per cent argyrol solution is substituted.—*The Treatment of Bronchial Fistulas, W. L. Keller, J. Am. M. Ass., September 22, 1923, lxxxi, 1006.*

Causative Factors and Treatment of Chronic Empyema.—This paper is based on a study of 310 cases at the Mayo Clinic during five years (1918–1923). The cases fall into three principal well defined groups: (1) latent or undrained empyema; (2) delayed healing following early drainage; and (3) persistent or recurrent empyema following drainage. Latent or undrained empyema was present in 105 cases, or more than 33 per cent, including 35 with delayed initial drainage. The effect of such delayed drainage was a fibrous membrane over the pleura fixing the lung in a partially collapsed condition, in some cases together with perforation, septic absorption, and structural deformity. Bronchial fistulas were present in about 28 per cent. Among the diagnoses made were pulmonary tuberculosis, bronchiectasis, pertussis, arthritis and nephritis. The most characteristic symptom was a chronic productive cough. Delayed healing following early drainage was observed in 150 cases. In about half of these incomplete drainage was the obvious cause of delayed healing. Partial granulation and closure of the drainage opening was by far the most common cause of failure to secure healing in acute empyema treated by open drainage. There were 90 cases of persistent or recurrent empyema following drainage. These patients were apparently in good health and working during intervals of two to seventeen years. In some instances the onset of symptoms was abrupt, in some insidious. A basis for persistent infection may be found in abscesses and cavities buried in thickened pleura. Additional causes of delayed healing were bronchial fistulas, tuberculous pleuritis, foreign bodies, massive collapse of the lung and fibrosis of the lung. Bronchial fistula occurred in 29 per cent of the whole series and 36 per cent of the recurrent cases, indicating that they result largely from lack of drainage. Communicating sinuses or cavities may become completely lined with epithelium and heal following their destruction by cautery. Tuberculous pleuritis is a common cause of delayed healing, and many cases are unrecognized for years because positive proof is lacking. Certain cases of originally pyogenic empyema may become tuberculous. In this series there were 29 cases (9.35 per cent) positively proved. Foreign bodies were present in 35 cases. They included bismuth paste, fragments of ne-

crosed ribs, and segments of rubber tubing. Ribs should be resected well back and not denuded of periosteum beyond the resection portion. In several cases of massive lung collapse the lung had been collapsed for months by large amounts of pus. Most, however, followed open drainage for pleurisy with effusion, an unjustifiable procedure. *Treatment:* The guiding principles are to secure healing, safeguard life, and, so far as possible, preserve function and structure. If a patient with chronic empyema can be cured by reëxpansion of the lung, a destructive operation is unjustifiable. Conservative methods should, therefore, be given the benefit of doubt. *1. Preliminary aspiration:* This is used for confirmatory diagnostic purposes. *2. Simple open drainage:* This is indicated in cases of cellulitis of the chest wall, osteomyelitis of the ribs, and foreign bodies complicated by large bronchial fistulas when the patient will not tolerate irrigation by the closed method. *3. Irrigation with antiseptic or saline solution:* This is of great advantage in all cases in which the cavity is large, as it greatly improves the general condition, diminishes the size of the cavity from 50 to 95 per cent, and often renders it practically sterile. Caution must be used in tuberculous cases, and here saline solution or nonirritating dye antiseptics are generally preferable to hypochlorite solution. The closed method of irrigation is simplest, can be instituted at once, and insures complete contact of the solution with all parts of the cavity. *4. Decortication:* This is the operation of choice when irrigation fails or there is an extensive residual cavity. *5. Plastic operation:* This is indicated when the lung cannot be made to expand to fill the cavity. Simple rib resection (Eslander), following antiseptic-solution sterilization, results in a large proportion of cures. The danger of recurrence, however, is greater than if the parietal pleura is sacrificed. In tuberculous cases, plastic operation following excision of the parietal pleura has yielded more cures than skin-muscle operations. A 2 per cent solution of gentian violet has proved of value as a decorticating agent and also sterilizes the field preparatory to plastic operation. Extrapleural rib resection in several stages, done under local and nerve trunk anesthesia, with or without nitrous oxide and oxygen, offers a method of cure in persistent large sterile empyema cavities. *Treatment of fistulas:* Small fistulas usually heal without special treatment; large ones require open drainage, following which irrigation or chemical cauterization may be employed.—*Causative Factors and Treatment of Chronic Empyema, C. A. Hedblom, J. Am. M. Ass., September 22, 1923, lxxxi, 999.*

Empyema Simulating Peritonitis.—A case of right-sided empyema, with marked changes in the pleura was wrongly diagnosed. It developed very acutely, with severe peritoneal symptoms, abdominal rigidity and diffuse pain and a point of pressure-pain to the right of the navel. An immediate laparotomy revealed no pus, but led to a possible diagnosis of ileus due to kinking. Absolutely no symptoms pointing to the empyema occurred during life. In the clinic there was dulness over the right thorax which, however, was given little attention on account of the overshadowing abdominal symptoms. Auscultation was impossible on account of the difficult respiration.—*Ein latentes Pleuraempyem mit akuten Peritonealerscheinungen, W. Goldschmidt, Wien. klin. Wchnschr., June, 1922, xxxv, 499.*

Epidemic Diaphragmatic Spasm.—Early in July, 1923, Maude M. Kelly reported to the Virginia State Board of Health a number of cases of a peculiar form of illness in Hanover County, characterized by an acute onset with epigastric pain, and later also a number in Caroline County; whereupon an investigation was ordered by the Commissioner of Health, to determine whether an epidemic was present, its essential clinical features, and to gather all available information as to its nature. *Clinical features:* Prodromal symptoms were usually absent. The attack nearly always began suddenly, with severe epigastric pain, which later extended to one or both sides of the lower thorax. Respiration was usually very difficult, and often very rapid. In most cases the temperature rose at the onset, and soon reached a maximum of 101° to 105°. Profuse perspiration was the rule. Nausea and vomiting occurred in about one-third; constipation usually. The attack was often followed by diarrhea. More than half the patients complained of headache, and some of pain in the lumbar spine, shoulders or extremities. The paroxysms of pain and dyspnea usually lasted between four and ten hours, and with their subsidence the temperature usually fell. Some cases had recurrences initiated by exposure or exertion. In some the severity of the pain and the accompanying abdominal rigidity were such as to suggest an acute surgical condition. In one case in which laparotomy was performed, nothing pathological was found. The differential blood count showed nothing noteworthy. Among the sequellae noted were streptococcus empyema, persistent diarrhea and otitis media. A review of medical history shows that a somewhat similar epidemic was described in Virginia in 1888 by W. C. Dabney. It was dubbed the "devil's grip." Sixteen of his patients were

students in the University of Virginia. The town cases were mostly in children, and it usually attacked all the children in the family. *Epidemiology:* Most of the cases reported have been in the northeastern part of the state. There has been an apparent spread through families by contact. Children are more often attacked than adults. Thus far only strictly rural communities have been affected, with the exception of a few cases in the city of Richmond. *Differential diagnosis:* The respiratory features differentiate it from the ordinary gastrointestinal disturbances. At the onset it may simulate acute surgical abdominal conditions, but there is no shock and the pulse is full and slow. The absence of the rash and the severe bone pains differentiate it from dengue. Its brief duration distinguishes it from the ordinary respiratory infections, as do the severe diaphragmatic symptoms. The active virus, whatever its nature, appears to be remarkably selective.—*Epidemic Transient Spasm, G. C. Payne and C. Armstrong, J. Am. M. Ass., September 1, 1923, lxxxi, 746.*

Miner's Silicosis.—Silicosis is a form of pneumonokoniosis produced by quartz, flint and other silicon dusts. Anthracosis produced by inhaled carbon particles (coal mining) is not as hazardous as silicosis. The carbon particles, when inhaled, produce a violent reaction with resulting phagocytosis and removal. The silicon dusts, on the other hand, produce a milder reaction, are less readily phagocytosed and tend to accumulate in the lymphatics, with resulting fibrotic changes. The amorphous forms of silicates seem to be innocuous. There is experimental evidence to show that crystalline silica induces fibrosis because of its chemical action and not in virtue of its physical properties. The time of onset of the pulmonary changes is dependent on the nature of the exposure. The disease at first progresses slowly. The earliest symptoms are anemia, loss of weight, dyspnea and cough. The sputum may be bluish-green in color and does not show tubercle bacilli. As the disease advances a tightness is felt in the chest and the dyspnea is marked. Cough and expectoration are increased and the latter may be bloody. In the final stage, the symptoms are all aggravated, the dyspnea being very marked and the expectoration profuse and hemorrhagic. The chest expansion is now negligible and often the right diaphragm is adherent. Percussion of the chest shows marked dulness, and sibilant and sonorous râles are present. A most valuable instrument in the early diagnosis is the roentgen ray. The sufferer can never be cured of his fibrosis by any therapeutic measures. His only salvation is to change his vocation with a view of preserving what normal lung tissue there is left. Two methods are available in the prevention of the disease, namely, mechanical exhaust ventilation and the wet process.—*Miner's Silicosis: Its Pathology, Symptomatology and Prevention, R. T. Legge, J. Am. M. Ass., September 8, 1923, lxxxi, 809.*

Lung Abscess.—Recent literature reveals two very important facts: (1) the importance of tonsillectomy as a causative factor, and (2) the apparently marked increase in general incidence. Tonsillectomy under general anesthesia is most frequently to blame. Lockwood, in a study of 54 cases of lung abscess seen at the Mayo Clinic, considered 16 due to tonsillectomy, in all but one case done under general anesthesia. In the present series of 34 cases seen at the Barnes Hospital, St. Louis, and elsewhere, 8 cases, or 24 per cent, followed tonsillectomy, all done under ether anesthesia. Sluder states that after more than 20,000 operations for tonsillectomy, performed by himself and staff under nitrous oxide, there have been no cases of lung abscess, and Lockwood records the absence of this sequel in 100,000 tonsillectomies at the Mayo Cinic. The symptoms may vary considerably. Usually there is a septic temperature and night sweats. Chills are common. Severe hemorrhages occur occasionally. The sputum is usually foul, and elastic tissue is frequently seen. Physical signs may indicate patches of consolidation, with bronchial breathing, râles and increased whisper, such as seen in tuberculosis. Roentgen ray findings are usually typical, provided the abscess is large. Dense (homogeneous) shadows are seen shading off into fairly good surrounding lung tissue. The apices and costophrenic angles are usually clear. Tangentially, the lung abscess often shows a more definite shadow than on anteroposterior view. Occasionally a fluid level is seen. A diagnostic pneumothorax should be performed to determine the presence of adhesions, prior to puncturing the lung. At the site of the adhesions a thoracotomy is done and the abscess located by exploratory aspiration. If, inadvertently, the pleura is opened, lung and pleura are sewed to the wound, which is packed and left for several days before another attempt is made. When the aspiration needle is in the abscess, it is opened, either with the cautery or by blunt dissection, and a large soft drainage tube introduced. It is customary to try medical treatment, postural drainage and bronchoscopy prior to any operative procedure. Pneumothorax is used

chiefly for diagnostic purposes, but may occasionally be followed by recovery. Of 13 patients operated on, 6 died, a mortality of 46 per cent. In Lockwood's series of 54 cases the surgical mortality was 41 per cent, and in his collected reports of all cases, 34.6 per cent. A large proportion of all lung abscesses follow tonsillectomy, and their most common situation is the right lower lobe.—*A Study of Thirty-Four Cases of Abscess of the Lung, J. J. Singer and E. A. Graham, J. Am. M. Ass., July 21, 1923, lxxxi, 193.*

Spirochetal Pulmonary Gangrene.—Evidence is accumulating that pulmonary gangrene may be caused by spirochetes and fusiform bacilli aspirated from an unclean mouth; furthermore, diagnosis can be made early by finding the microörganisms in the washed sputum, offering an opportunity for specific arsenical therapy. Since the early publications of Castellani in India and Rona in Germany, many cases of bronchopulmonary spirochete infection have been reported from Europe and the tropics, but only 24 thus far in the United States. Clinically, the condition is readily confused with tuberculosis, abscess and pneumonia. Four cases are here reported, with two necropsies and a microphotograph of a smear preparation from one case. The fact that the microörganisms are poorly stained by the usual laboratory methods, and do not grow on the ordinary media, may account for past failures to observe them. The most characteristic clinical feature is the sputum, which, in a well developed case, usually has a foul odor; it may be in appearance jelly-like, blood-tinged, purulent or necrotic. Preparations stained by the Fontana method always show the spirochetes and fusiform bacilli, and these, when injected into traumatized animal tissues, produce gangrene. In tissues the Levaditi method should be used.—*Spirochetal Pulmonary Gangrene, B. S. Kline and M. A. Blankenhorn, J. Am. M. Ass., September 1, 1923, lxxxi, 719.*

Pulmonary Amebiasis.—In most cases amebic infection of the lung is due to direct extension of a previously existing hepatic abscess through the diaphragm. However, abscess of the lung due to *Entamoeba histolytica* can occur quite independently of abscess of the liver, though seldom recognized during the lifetime of the patient. In the so called primary pulmonary amebiasis, the route by which the parasites gain the pulmonary circulation is probably by direct embolism through the circulation from the colon. Three striking cases of primary pulmonary amebiasis are reported, in which the diagnosis was arrived at by their previous history of amebic infection, by the marked leucocytosis, by the absence of tubercle bacilli in the sputum, and by observing the instantaneous and almost miraculous effect of emetine therapy. The bursting of an unrecognized liver abscess into the lung may produce the most varied pulmonary signs, and several instances of such an accident are described. Primary pulmonary amebiasis may simulate closely bronchopneumonia or miliary tuberculosis. When a hepatic abscess has ruptured into the lung, the resulting pulmonary infection may closely resemble bronchiectasis or tuberculosis. In either form the therapeutic action of emetine and ipecacuanha is striking and is generally recognized as more rapid and lasting than in amebic infections of the bowel.—*Pulmonary Amebiasis, P. Manson-Bahr, Lancet, September 22, 1923, ccv, 599.*

Coccidioidal Granuloma.—Coccidioidal granuloma, a rare disease and in many ways resembling blastomycosis and tuberculosis, but entirely distinct from them, results from infection with *Coccidioides immitis*, a mould of the *Ascomycetes* group. When cultivated on artificial media, the mould grows out in a mycelium with hyphae. The parasites occur abundantly in the diseased tissues as doubly contoured spheres, usually from 5 to 50 micra in diameter. The protoplasm is granular. A hundred or more spores may develop in the protoplasm, to be later released by rupture of the capsule of the containing parasite. The infection may be cutaneous, pulmonic (or both), or systemic. Infection of the lungs produces symptoms like those of pulmonary tuberculosis, and even the lung lesions resemble very closely those of tuberculosis. The prognosis of all forms of the disease is grave. A brief review of the literature is given together with the report of a typical case with symptoms at first suggesting pulmonary tuberculosis.—*Introduction of Coccidioidal Granuloma into Chicago, E. F. Hirsch, J. Am. M. Ass., August 4, 1923, lxxxi, 375.*

Pseudotuberculosis of Placenta.—A six months' placenta is described with microscopic nodules markedly resembling tuberculosis. The absence of bacilli and the other clinical findings (the fact that the patient lived) were against tuberculosis. In spite of the absence of spirochetes and vascular changes the case is considered to be of syphilitic origin.—*Pseudotuberkulose der Placenta, Geipel, Centralbl. f. allg. Path., October, 1922, xxxiii, 57.*